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Book of Abstracts

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Fisica del Modello Standard ed oltre - I / 0**Ricerca di effetti di nuova fisica nel decadimento $B_s \rightarrow \mu^+ \mu^-$ a LHCb**

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QCD - II / 1**Misure piu' recenti fatte a HERA e il loro impatto sulle pdf a LHC**

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Fisica del Modello Standard ed oltre - II / 2**Ricerche di nuova fisica ad ATLAS a LHC**

Questo talk presenta le prime ricerche di particelle supersimmetriche nei dati raccolti nel 2010 dall'esperimento ATLAS a LHC, in collisione protone protone a $\sqrt{s}=7$ TeV. Le ricerche sono state eseguite in vari canali. La sensitivita' di questi risultati alla produzione di squarks e gluini sorpassa di molto quella di altri esperimenti ai colliders. Inoltre, verranno riportate le ricerche di particelle stabili e/o a lunga vita media, traendo pieno vantaggio dalle eccellenti prestazioni del rivelatore.

Fisica del Modello Standard ed oltre - I / 3**Measurement of top quark pairs production cross-section in the lepton+jets channel at $\sqrt{s}=7$ TeV at the LHC with the ATLAS experiment**

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Top quark pair production in pp collisions has been measured at a center of mass energy of 7 TeV using 36.6 pb⁻¹ of data recorded in 2010 by the ATLAS experiment at the LHC. A cut based analysis was applied to select events containing exactly one energetic charged lepton, large missing transverse energy compatible with the presence of an undetected neutrino and four jets, of which at least one tagged as originated from a b quark. The main backgrounds, due to QCD and W+jets processes, have been evaluated directly by data, while other sources of background and the signal are described by a Monte Carlo simulation.

The final result is obtained combining the electron and muon channels using a technique based on Bayes' theorem that takes into account both correlated and uncorrelated systematics.

QCD - II / 6

La fisica dei jet in ALICE

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QCD - II / 8

Misure di fotoni diretti e prospettive per H→gammagamma in collisioni pp a $\sqrt{s} = 7$ TeV in ATLAS

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Verra discussa una misura della sezione d'urto per la produzione inclusiva di fotoni diretti isolati, basata su 880nb-1. La misura copre i range di pseudorapidità $|\eta| < 1.37$ e $1.52 < |\eta| < 1.81$ per energie trasverse $15 < ET < 100$ GeV. I risultati sono confrontati con predizioni di calcoli di QCD perturbativa a NLO. Inoltre saranno presentati i risultati preliminari per il canale a 2 fotoni basati sull'intero campione 2010 e le prospettive delle ricerche di H→gammagamma con il rivelatore ATLAS.

Sessione di apertura - I / 9

Apertura del congresso da parte delle autorità locali

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Talk di benvenuto da parte del
Dott. Catuscia Marini (Presidente della Regione Umbria),
Prof. Francesco Bistoni (Magnifico Rettore dell'Università di Perugia),
Prof. Fausto Elisei (Preside della Facoltà di Scienze),
Prof. Caterina Petrillo (Direttore dipartimento Fisica),
Dott. Pasquale Lubrano (Direttore della Sezione INFN di Perugia)

Sessione di apertura - I / 10

La fisica ad LHC: stato attuale e prospettive future

Sessione di apertura - I / 11

Fenomenologia del Modello Standard

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Sessione di apertura - I / 12

Fenomenologia della Fisica dei Saponi Pesanti

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Prospettive alla super B-factory / 13

Physics at the future super B-factories

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Sessione di apertura - I / 14

Review of astrophysics

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Fisica dei Saponi Pesanti - I / 15

First results in Heavy Flavor Physics at CMS

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The analysis of data collected by the CMS experiment in 2010 (equivalent to an integrated luminosity of 40 pb⁻¹) has yielded several physics results concerning the production mechanisms of heavy flavors at the unprecedented center-of-mass energy of 7 TeV.

Reconstruction techniques of heavy-flavored particles will be shown, with particular focus on the triggers expressly designed to select them. Measurements of the b-bbar cross section both with jet “b-tagging” techniques and exclusive states, such as B₀, B⁺ and B_s, will be presented, as well as comparisons with theoretical predictions.

Charmonium and bottomonium cross-section measurements will be shown, and, in the J/psi case, the first determinations of the B-decay feed-down fractions and polarization.

Fisica dei Saponi Pesanti - I / 16

Risultati di Fisica di LHCb

Fisica dei Saponi Pesanti - I / 17

Heavy Flavor: theoretical predicitions in the precision Era

I review the status of the theoretical predictions in the Heavy Flavor Sector.

I focus on the observables of interest for new and next future experiments, discussing both perturbative and non-perturbative uncertainties.

Fisica dei Saponi Pesanti - I / 18

Risultati recenti a BaBar

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We present some of the most recent results from the analysis of the full dataset collected by the BaBar experiment. They include searches for rare decays in the charm sector, the latest news from the bottomonium spectroscopy and from the analysis of the data sample collected above the $Y(4S)$ mass.

Fisica dei Saponi Pesanti - I / 19

B Physics at CDF

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Nuove Tecnologie - I / 20

Crystal collimation of hadron beam at CERN, the UA9 experiment

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Hadron collider collimation is now a big challenge in view of the future increase of beam currents at LHC. A description of the UA9 experiment at CERN SPS is reported. Its main aim is to demonstrate the feasibility of a new concept of collimation based on a bent crystal able to clean the dangerous beam halo via the crystal channeling effect. Data from tests performed on SPS will be discussed showing how the technology is very close to be implemented in LHC.

Nuove Tecnologie - I / 21

Stato e prospettive della rivelazione di fotoni con contatori a gas

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Nuove Tecnologie - I / 22

Esperimenti di fisica nucleare con ioni leggeri per applicazioni in adroterapia

Nuove Tecnologie - I / 23

DREAM Collaboration: Risultati recenti sulla calorimetria dual readout

Nuove Tecnologie - I / 25

Results of the SPARC Free-Electron Laser Experiment

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The SPARC project is a Free Electron Laser (FEL) at the LNF, Frascati (Italy). It is also the test and training facility for the VUV/soft X-ray FEL project named SPARX. The SPARC FEL is composed by a high brightness photo-injector providing a high-quality electron beam at energies up to 150-200 MeV and an undulator beam line composed by six magnetic undulator sections with variable gap. The main experimental results in the acceleration-compression of the electron bunches and the laser pulses emitted in the undulator will be presented in various regime of operation.

Sessione Dottorandi - Ia / 26

Detection of anisotropies in the arrival directions of 300 GeV - 10 TeV cosmic rays with the ARGO-YBJ experiment

ARGO-YBJ is an RPC “carpet” aimed to the detection of extensive air showers induced by charged cosmic rays and gamma-rays in the energy range GeV-PeV. The experiment obtained important results in cosmic-ray physics and gamma-ray astronomy. In the 300 GeV - 10 TeV energy range it is operated in “shower mode” and a good reconstruction of the primary arrival direction is performed within the zenith angle interval 0°-45°. The data-set collected by ARGO-YBJ since November 2007 has been analyzed and very significant anisotropies (more than 10 standard deviations), with relative intensity of the order of 10^{-3} have been found. The angular extent of these regions spans 0° to 15°. The observation is not explained with the current models of galactic magnetic field and propagation of cosmic rays in the galaxy. In this work the results of a systematic search of anisotropies in the experimental data are presented.

Sessione Dottorandi - Ia / 27

Combined measurement of the inclusive diffractive cross sections at HERA

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A combination is presented of the inclusive diffractive cross section measurements made by the H1 and ZEUS collaborations at HERA. The analysis uses all available diffractive deep inelastic scattering data, $ep \rightarrow eXp$, recorded between 1997 and 2007 and selected with the Large Rapidity Gap technique. Correlations of systematic uncertainties are taken into account by the combination method, resulting in an improved precision. Final cross sections can be used in a next-to-leading order QCD fit

to extract a new set of diffractive parton distribution functions with small experimental uncertainties.

Sessione Dottorandi - Ia / 28

Charmless two-body B hadron decays at LHCb with 2010 data

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The LHCb experiment is designed to perform flavour physics measurements at the Large Hadron Collider. Using data collected during the 2010 run, we reconstructed a sample of $H_b \rightarrow h+h'$ decays, where H_b can be either a B_0 meson, a B_s0 meson or a Λ_b baryon, while h and h' stand for π , K or p . Such decays are sensitive probes of the Cabibbo-Kobayashi-Maskawa matrix and have the potential to reveal the presence of New Physics. We present preliminary measurements of the direct CP asymmetries in the $B_0 \rightarrow K^+ \pi^-$ and $B_s0 \rightarrow \pi^+ K^-$ decays.

Sessione Dottorandi - Ia / 29

Measurement of Forward-Backward asymmetry in $pp \rightarrow Z/\gamma^* + X \rightarrow \mu^+\mu^- + X$ with the ATLAS detector

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The V-A nature of the electroweak current leads to an asymmetry in the polar angle distribution in the rest frame of Z/γ^* : the measurement of such a quantity, around Z pole, can provide a precise determination of the weak mixing angle of the Standard Model. In this contribution the asymmetry measurement in the muon channel will be presented with the data collected by the ATLAS experiment during 2010.

Sessione Dottorandi - Ib / 30

J/ψ production at central rapidity with the ALICE experiment at LHC

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J/ψ can be measured in the ALICE experiment at central rapidity through the dielectron channel ($J/\psi \rightarrow e^+e^-$), reaching $p_T=0$. In this contribution we report a first result obtained concerning the analysis of J/ψ production in pp collisions at $\sqrt{s}=7$ TeV in the rapidity range $|y|<0.9$ and discuss the possibility to separate prompt and secondary J/ψ coming from b-hadrons decays. We also give the status of the ongoing analysis and perspectives for the quarkonium measurements at central rapidity in Pb-Pb collisions.

Sessione Dottorandi - Ib / 31

Collins Asymmetries measurement in the inclusive production of hadron pairs at BaBar

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Transversity Distribution, which describes the quark transverse polarization inside a transversely polarized nucleon, is the last leading-twist missing piece of the QCD description of the partonic structure of the nucleon. Transversity can be extracted from semi-inclusive deep inelastic scattering data, where it couples to a new, unknown fragmentation function, called Collins function. We present a measurement of the azimuthal asymmetries in the process $e^+e^- \rightarrow \pi\pi X$ (inclusive hadron production), in which the two pions are produced in opposite hemispheres, based on the full BABAR data sample. The Collins function is extracted from the measured asymmetries.

Sessione Dottorandi - Ib / 32

The New Hadrons

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I will discuss the state of the art on the exotic charmed mesons (XYZ) discovered since 2003, which do not fit in the standard $c\bar{c}$ spectrum. I will revise the clues that have been collected on their internal structure starting from the experimental information available on their production and decay mechanisms. Finally I will consider some processes in which XYZ could play a role as intermediate states: what kind of additional information can we learn from that?

Sessione Dottorandi - Ib / 33

The NA62 RICH detector

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The NA62 experiment is designed to measure the very rare kaon decay $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ at the CERN SPS with a 10% accuracy. The Standard Model prediction for the branching ratio is $(8.5 \pm 0.7) \times 10^{-11}$. One of the challenging aspects of the experiment is the suppression of the $K^+ \rightarrow \mu^+ \nu \bar{\nu}$ background at the 10^{-12} level. To satisfy this requirement a Ring Imaging Cherenkov Detector (RICH), able to separate π^\pm from μ^\pm in the momentum range between 15 and 35 GeV/c, with a μ rejection factor better than 5×10^{-3} , is needed. The RICH must also have a time resolution of about 100 ps to disentangle accidental time associations of beam particles with pions. The RICH will have a very long focal length (17 m) and will be filled with Ne gas at atmospheric pressure. Two test beams were held at CERN in 2007 and 2009 with a RICH prototype. The results of the two test beams will be presented: the μ misidentification probability is found to be about 0.7% and the time resolution better than 100 ps in the whole momentum range.

Sessione Dottorandi - Ib / 34

Diboson search and multivariate tools in the $l\nu+hf$ channel at CDF

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Sessione Dottorandi - Ib / 35

The photon veto system in the NA62 experiment

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The rare decays $K \rightarrow \pi \nu \bar{\nu}$ are excellent processes to study the physics of flavour. Thanks to the GIM suppression, these decays give precision tests of the Standard Model and constraints for models of New Physics.

The collaboration of the NA62 experiment at the CERN SPS aims to collect $O(100)$ $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ events in about 2 years of data taking to extract a 10% measurement of the CKM parameter $|V_{td}|$.

Since the signal consists of a single π^+ track, the guiding principles for the construction of the NA62 detectors are an accurate particle ID, precise timing and excellent veto efficiency. In particular, the veto inefficiency for photons from $K^+ \rightarrow \pi^+ \pi^0$ decays should be smaller than 10^{-8} .

The photon veto system consists of three detectors covering different angular regions: Large Angle Vetoes (LAV), Liquid krypton calorimeter (LKr) and Small Angle Veto (SAV).

In this talk the photon veto system of the NA62 experiment will be discussed with particular attention to the LAV detectors.

Sessione Dottorandi - Ib / 36

The transverse-momentum distribution of the Higgs boson at the Tevatron and the LHC

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One of the main goals of high-energy colliders is the discovery of the Higgs boson and the study of its properties, either in the Standard Model or in its possible extensions. Among the various kinematical distributions, a major role is played by the transverse-momentum (q_T) spectrum of the Higgs boson. We present a calculation of this distribution that uniformly combines small- q_T resummation at the highest accuracy available to date with the fixed-order prediction valid at large q_T . We show numerical results for the Higgs boson q_T -spectrum and an estimate of the corresponding theoretical uncertainties. The calculation is implemented in the updated version of the numerical code HqT. Our predictions directly impact, through a reweighting procedure, the Higgs search being carried out at the Tevatron and the LHC.

Sessione Dottorandi - Ib / 37

Performance and optimization of the KM3NeT high-energy neutrino telescope

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The observation of extraterrestrial high-energy neutrinos will provide unique piece of information on the most violent and highest energy processes in our Galaxy and far beyond. Indeed, their mea-

surement will allow for new insights into the acceleration mechanisms and their localization in galactic and extragalactic sources, clarifying the role of the hadronic component. KM3NeT is an international consortium with the aim to build a research infrastructure in the Mediterranean Sea hosting an underwater multi-km³ high-energy neutrino telescope. KM3NeT was funded by European Union with a Design Study (2006-2009) and a Preparatory Phase (2009-2012). The Km3NeT Design Study was concluded with the publication of the Technical Design Report (TDR) that outlines the main technologies. The final design, based on detection units made of flexible towers equipped with multi-photomultipliers, is defined in the Preparatory Phase. The simulation of detector response to astrophysical neutrino fluxes, with particular emphasis on point-like sources, represents an essential tool. Detector performance is presented in terms of sensitivity (flux that can be excluded at 90% CL) and discovery potential (flux that can be detected a 5σ above the background noise). Optimization results and detector response to point like sources will be shown.

Fisica Astroparticellare - I / 38

Virgo ed i risultati degli esperimenti di onde gravitazionali

The Virgo experiment reached during the past science run a sensitivity very close to the design one. During the last year the detector has been improved suspending the main interferometer mirrors with monolithic fibers, with the goal of reducing the thermal noise contribution. At the same time the design of the next detector improvements are on-going and they will bring to the installation of Advanced Virgo. This talk resumes the actual detector status, some of the past science run results and plans for the future developments.

Fisica Astroparticellare - I / 39

Ground based detection of VHE and UHE cosmic rays: MAGIC, ARGO and AUGER

A major boost in the cosmic ray (CR) studies came in the last decades from the experimental effort to investigate the extreme energy region >1 EeV (UHE) of the CR spectrum and the nature of the astrophysical sources responsible for the CR acceleration.

The AUGER observatory provided a clear indication of the attenuation of the CR flux by the GZK effect and yielded puzzling results on the composition indicating a heavier component for increasing energy.

The higher statistics of events with $E > 60$ EeV, only slightly deviated by the intergalactic magnetic field, allowed to study the anisotropy in the CR arrival direction, which seems to correlate with the distribution of matter in the nearby Universe. The nature of these sources is still debated, possibly being Active Galactic Nuclei, starburst galaxies, nearby radiogalaxies.

These objects are investigated in the Very-High Energy (VHE, $E > 100$ GeV) region by ground based gamma-ray detectors.

Gamma-ray emission stems from interaction processes of the accelerated particles, leptons and hadrons, with the environment surrounding the acceleration site, thus providing direct information on the acceleration mechanism in astrophysical sources. Hadronic (i.e. CRs) acceleration sites are likely hosted in supernova remnants, but no clear evidence has been found for hadronic processes in extragalactic sources, that are assumed to produce the UHE CRs.

The gamma-ray detectors based on the air Cherenkov technique, like MAGIC, or on direct detection of the particles produced in the atmospheric air showers, like ARGO, succeeded to discover new sources and new populations emitting VHE gamma-rays. The VHE emission, often correlated with electromagnetic emission in other wavebands (from radio to X-rays) supplies the observational standpoint to disentangle the predicted leptonic emission from the long-sought hint of CR acceleration.

Fisica Astroparticellare - I / 40**Fermi, Pamela, AGILE**

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The last generation of high energy gamma-ray and cosmic-ray space experiments are providing an unprecedented view of the high energy universe allowing continuous progresses in the understanding of astroparticle physics. The main results and future perspectives for Agile, Fermi and Pamela space experiments are presented.

Fisica Astroparticellare - I / 41**Materia Oscura: ricerca diretta ed indiretta**

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I will review the main results in the direct detection of dark matter particles and their possible interpretation in terms of Supersymmetric extensions of the Standard Model. I will address also the indirect researches of dark matter through the measurement of its annihilation products in the halo of the Milky Way. Glimpses on the state of the art in the different detection channels will be provided.

QCD - I / 42**Low energy kaon-nucleon/nuclei interaction studies at the DAFNE accelerator (SIDDHARTA and AMADEUS experiments)**

Author: Catalina Oana Petrascu¹

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Two experiments, SIDDHARTA and AMADEUS, performing low-energy kaon-nucleon/nuclei interaction studies at the best low-energy kaon beam in the world, the DAFNE collider, will be presented. The SIDDHARTA experiment, running at the DAFNE collider in 2009, took the best world's data on kaonic hydrogen (shift and width of 1s level induced by the presence of the strong interaction) and the first ever of kaonic helium3 (2p level) and kaonic deuterium. (1s level). The results of SIDDHARTA will allow important steps forward in the understanding of low-energy QCD in the strangeness sector. Results of the data analyses, together with future plans will be presented.

The AMADEUS experiment aims to perform dedicated precision studies in the sector of low-energy kaon-nuclei interaction at the DAFNE collider at LNF-INFN. In particular, the experiment plans to perform measurements of the so-called (very debated) deeply bound kaonic nuclei and, if existent, to measure their properties (binding energies and widths) by using the process of stopped kaons in cryogenic gaseous targets (He3 and He4). AMADEUS will measure all particles coming from negative kaons stopped in these targets, so performing a full study of various interaction channels.

Other important measurements proposed by AMADEUS are the low-energy interaction studies of negative kaons in various targets. The kaon beam is ideal (low-energy kaons from the phi-decay at DAFNE) and the setup, an implementation in the central region of the KLOE detector with dedicated additional

items, is having very good performances (high acceptance and capacity to measure charged and neutral particles with excellent resolution). The results of AMADEUS will give a boost to the sector of non-perturbative QCD in the strangeness sector. The physics program, preliminary results from analysis of KLOE data and future plans will be presented.

QCD - I / 43

The PANDA experiment: antiproton physics at FAIR

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The new Facility for Antiproton and Ion Research (FAIR), under construction at the GSI laboratory at Darmstadt, in a few years will make available primary beams of ions, from hydrogen to uranium, and secondary beams of radioactive ions and antiproton with unique features.

In the large research areas opened by this new center (from atomic to plasma physics, to the study of nuclear matter up to extreme density conditions), the antiproton physics is an absolute innovation for this laboratory. Through an High Energy Storage Ring (HESR) for antiprotons, an antiproton beam will be available in a momentum range from 1.5 to 15 GeV/c, which will interact on a hydrogen target.

The products of the interaction, including hadronic systems with strangeness and/or charm, will be detected with the PANDA magnetic spectrometer (antiProton ANnihilation at DArmstadt), and the spectroscopic analysis will allow a detailed investigation on a number of open problems of the hadronic physics, as the quark confinement, the existence of non-conventional meson states (so-called glueballs and hybrids), the structure of hadrons and of the strong interaction, with particular attention to charmonium spectroscopy.

An overview of the scientific program of PANDA and the current status of the project will be presented.

QCD - I / 44

BESIII: stato e risultati

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Nuove Tecnologie - II / 45

Zona di interazione e background nell'acceleratore SuperB

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Nuove Tecnologie - II / 46

Nuove tecnologie di accelerazione al limite della energia e della intensità

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Nuove Tecnologie - II / 47

Immagini tomografiche con fasci di protoni

Nuove Tecnologie - II / 48**Nuove tecnologie di data processing ad LHC: dal Grid al Cloud Computing e oltre**

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QCD - II / 49**Spin physics at COMPASS**

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COMPASS is a fixed target experiment at the CERN SPS.

The COMPASS physics programme is dedicated to the study of the nucleon spin structure and of hadron spectroscopy. The nucleon spin structure is investigated by means of Deep Inelastic Scattering reactions, using a 160GeV muon beam, impinging on a solid state target. The recent results on the gluon contribution to the nucleon spin, on the helicity distributions for different quark flavors and on the transverse spin effects are presented.

QCD - II / 50**The Jefferson Laboratory program at 12 GeV**

CEBAF at Jefferson Lab (USA) is an electron accelerator devoted to basic research in hadronic physics in order to understand the strongly interacting matter. It is based on superconducting cavities and capable of delivering a “continuous” (pulses spaced of 2 ns), highly polarized beam of present maximum energy of 6 GeV to three experimental halls A, B, C. The design features and excellent performance of the accelerator made it possible to plan an upgrade in energy to 12 GeV without substantially altering the construction scheme of the accelerator. The program includes the construction of major new experimental facilities for the existing halls and the construction of a new experimental hall. The project will be completed by the year 2013 and the commissioning of the experimental halls will be extended until the end of 2015.

The research program that has motivated the upgrade in energy to 12 GeV includes: the study of the nucleon “tomography” through the study of generalized parton distribution functions (GPDs) and transverse momentum dependent distribution functions (TMDs), the study of exotics and hybrid mesons to explore the nature of the quarks confinement, precision test of the Standard Model through parity-violating electron scattering experiments. In this presentation an overview of the experimental program will be presented, with particular emphasis to the research program of the experimental halls A and B.

Fisica del Modello Standard ed oltre - I / 51**Highlights of High Pt Physics at the Tevatron**

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QCD - II / 52

Talk teorico

QCD - II / 53

Electromagnetic Nucleon Form Factors: perspectives and challenges for the future**Corresponding Author:** etomasi@cea.fr

The study of electromagnetic nucleon form factors is object of experimental and theoretical studies since decades. At moderate values of the momentum transfer squared, q^2 , the individual determination of the electric and magnetic FFs strongly constrain the nucleon models, whereas at larger q^2 the validity of analyticity and of the asymptotic properties predicted by QCD can be tested. New possibilities are opened by the recent advances in accelerator technology and polarimetry. The challenges opened by FFs measurements at high values of transferred momentum and/or in the search of better precision are related to the validity of radiative corrections, the modelization of the background and to the interpretation, which is related to the description of the internal structure of the nucleon. At the accelerator complex FAIR (Darmstadt, Germany) a program of measurements of electromagnetic proton form factors is foreseen in the time-like region, with the detector PANDA. The high intensity and high energy antiproton beams will open the possibility to determine these form factors in a wide kinematical range, through the annihilation reaction $p\bar{p} \rightarrow e^+e^-$ and also accessing for the first time the unphysical region. In the space-like region, the polarization method has been recently applied. The very precise data show an unexpected behavior, in contradiction with most of the nucleon models. The time-like data, together with the information from the space-like region, will provide the experimental ground for a unified view of the electromagnetic structure of the proton as observed in scattering and annihilation reactions. The present status and future perspectives in this field will be presented.

Fisica del Modello Standard ed oltre - I / 54

SUSY searches at LHC with the CMS detector**Corresponding Author:** michele.pioppi@pg.infn.it

The cascade decay of heavy supersymmetric particles is expected to produce energetic jets, missing transverse momentum and leptons. A selection of the search strategies employed in CMS are described and the results obtained with the 35/pb of data recorded in 2010 are presented.

Fisica del Modello Standard ed oltre - I / 55

Misure di massa di nuove particelle a LHC: la variabile cinematica MT2

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Sessione Dottorandi - II / 56

Produzione di MESONI in interazioni fotone fotone a DAFNE

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Sessione Dottorandi - II / 57

Ricerca di Heavy Stable Charged Particles con il rivelatore CMS a LHC

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La ricerca di “nuova fisica”, cioè di evidenze sperimentali a supporto di teorie proposte per sanare alcuni aspetti problematici del Modello Standard, costituisce uno degli obiettivi principali dell’esperimento CMS a LHC. Alcune teorie Supersimmetriche e modelli che invocano l’esistenza di extra-dimensioni, predicono l’esistenza di particelle cariche, con masse dell’ordine del centinaio di GeV e con vite medie sufficientemente lunghe per poter attraversare CMS senza decadere. Tali particelle, genericamente indicate col nome di “Heavy Stable Charged Particles” (HSCP), lascerebbero nel detector una traccia simile a quella prodotta dai muoni, ma con una ionizzazione specifica e un tempo di volo superiori a quelli delle particelle note. Nelle collisioni pp alle energie di LHC, le particelle “standard” sono ultrarelativistiche, per cui l’osservazione di tracce cariche con $\beta \ll 1$ costituirebbe una caratteristica distintiva della produzione di HSCP. Dalla misura combinata del momento e del parametro $\beta = v/c$ della traccia si può risalire alla loro massa. Nell’esperimento CMS, β si può ottenere dalla ionizzazione specifica (dE/dx) nel tracker e/o dal tempo di volo (TOF) nei rivelatori di muoni. Con i primi 3.1 pb⁻¹ raccolti da CMS a $E_{cm} = 7$ TeV, sono stati posti limiti sulle masse di alcuni tipi di HSCP utilizzando soltanto la ionizzazione specifica nel tracker per la determinazione di β , mentre per l’analisi dei successivi 35pb⁻¹ raccolti nel 2010 e dei dati che si raccoglieranno nel 2011 è previsto anche l’utilizzo della misura del TOF. In questa comunicazione verranno presentati i risultati preliminari ottenuti dall’analisi delle tracce osservate nelle camere a deriva del barile di CMS, come la misura dell’efficienza di identificazione di HSCP da parte del trigger di muoni e la misura dei tempi di volo finalizzata alla stima del parametro β .

Sessione Dottorandi - II / 58

Front-end analogico per pixel ibridi e monolitici in tecnologia CMOS ad integrazione verticale per il layer0 di SuperB

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Per il progetto del Layer0 del rivelatore di vertice (Silicon Vertex Tracker, SVT) di SuperB, cioè lo strato di rivelazione più vicino al punto di interazione dei fasci, sono state proposte tre soluzioni

differenti: rivelatori a striscia di ridotta lunghezza (striplets), sensori a pixel ibridi e pixel monolitici attivi (Monolithic Active Pixel Sensors, MAPS) in tecnologia CMOS. I rivelatori a striscia risultano essere una tecnologia matura e sono caratterizzati da un ingombro ridotto. Questa soluzione ha però lo svantaggio che, alla massima luminosità della macchina, mostra una scarsa efficienza a causa degli elevati livelli di background. Una soluzione a pixel ibridi con ridotto pitch (50 μm) consentirebbe l'utilizzo di questi sensori anche ad elevati rate di eventi ($\sim 100 \text{ MHz/cm}^2$) con buona efficienza. La limitazione di questa tecnologia è rappresentata da un ingombro relativamente elevato, il quale può incrementare la probabilità di fenomeni di scattering multiplo, anche se, recenti tecniche di integrazione verticale a basso contenuto di materiale per l'interconnessione tra elettronica e sensore potrebbero mitigare questo problema. I sensori MAPS considerati in questo studio risultano caratterizzati dall'utilizzo di una n-well a giunzione profonda (deep n-well, DNW) quale elemento di raccolta della carica. Questi dispositivi sono in grado di soddisfare i requisiti del Layer0 di SuperB dal punto di vista dell'ingombro, in quanto il loro substrato può essere assottigliato fino a qualche decina di micrometri senza significativa perdita di segnale. Nell'ambito della collaborazione VIPIX sono state progettate due strutture di test: la prima, SuperPix1, è un chip di front-end per pixel ibridi contenente una matrice di 32x128 elementi; la seconda, ApselVI, è una matrice di 128x96 pixel monolitici attivi. L'utilizzo dei processi ad integrazione verticale (3D) ha permesso di realizzare due layer CMOS con lunghezza minima di canale pari a 130 nm, consentendo un incremento della densità funzionale rispetto a prototipi precedentemente sviluppati per la stessa applicazione, ma progettati in tecnologia CMOS planare. Le tecniche 3D permettono la realizzazione di circuiti a segnali misti, potenzialmente immuni da problemi di crosstalk tra parte analogica e parte digitale. In particolare, nei MAPS a DNW l'utilizzo di tecniche 3D può migliorare anche l'efficienza di raccolta della carica grazie alla possibilità di ridurre l'area delle n-well competitive, necessarie per i transistori a canale p, nello strato in cui è presente l'elettrodo di raccolta a deep n-well. I canali di lettura integrati nelle celle elementari delle matrici (il cui pitch è di 50 μm per entrambe le strutture di test) risultano costituiti da una sezione analogica formata da un preamplificatore di carica e da uno stadio di formatura del segnale, seguita da un circuito comparatore e dai blocchi logici necessari per implementare la lettura selettiva dei pixel che hanno rivelato un evento. La lettura dei dati presenti nella matrice potrà avvenire in modalità triggered o data-push. Questo lavoro descrive il progetto di due circuiti di front-end per pixel ibridi e per sensori monolitici a pixel attivi in tecnologia CMOS ad integrazione verticale per applicazioni di tracciatura di particelle cariche, con particolare riferimento al Layer0 di SuperB. L'articolo, oltre ad evidenziare i criteri per il progetto dei canali di lettura, discuterà le loro principali caratteristiche e i risultati delle simulazioni circuitali.

Sessione Dottorandi - II / 59

Spettrometro per elettroni prodotti da accelerazione laser plasma dell'esperimento PLASMONX ad LNF

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Sessione Dottorandi - II / 60

Measurement of production cross sections and polarization of J/psi mesons in proton-proton collision at $\sqrt{s} = 7 \text{ TeV}$ at the LHCb experiment

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Despite the large experimental and theoretical efforts, the J/psi production rate and states in hadronic collisions are not yet satisfactorily understood. The comparison between the measured J/psi differential cross section with the most recent theoretical models shows a general good agreement but the cross section alone is not sufficient to discriminate between the different models proposed and other observables, like for example the J/psi polarization, must be measured.

The double differential J/psi cross section as a function of transverse momentum and rapidity has been measured at LHCb with 5 pb^{-1} out of the 37 pb^{-1} data sample recorded by the experiment

during the 2010 data taking, disentangling the prompt component and the component coming from the b-hadrons decays.

With the full data sample LHCb aims to give a measurement of the prompt J/psi polarization with a full angular analysis, in both the polar and azimuthal angle.

Sessione Dottorandi - II / 61

W/Z boson production in muonic final states at the ATLAS experiment

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W and Z boson production has been investigated by the ATLAS Collaboration in proton-proton collisions at $\sqrt{s} = 7$ TeV. New preliminary precision measurements of the inclusive Drell-Yan cross sections based on the complete data statistics collected in 2010, corresponding to a luminosity of about 35 pb^{-1} , are presented with particular emphasis on the muon decay channels. The accurate control on experimental systematic uncertainties, which are at the percent level, shows advanced understanding of the muon trigger and reconstruction achieved after the first year of data taking at the LHC. The measured W^\pm and Z/γ^* cross sections, and their ratios, are in agreement with NNLO QCD calculations and start to be sensitive to the choice of the parton distribution functions. A measurement of the W^+W^- diboson production cross section is also presented.

Sessione Dottorandi - II / 62

Physics results with the ALICE TOF detector

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The ALICE detector collected collisions at LHC at 0.9 and 7.0 TeV c.m.s. with proton-proton and at 2.76 TeV with Lead-Lead. ALICE, compared with other LHC experiments, has several detectors with Particle IDentification (PID) capabilities. Physics results involving PID will be presented both for pp and Pb-Pb interactions, with special emphasis on the Time-Of-Flight (TOF) analysis.

Sessione Dottorandi - II / 63

Spettroscopia del Charmonio a BABAR

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Lo studio della spettroscopia del charmonio ha ricevuto importanti contributi dai risultati delle B-factories BaBar e Belle. Nell'ambito della spettroscopia del charmonio convenzionale, uno dei maggiori successi è stata la scoperta e la misura delle proprietà della $\eta_c(2S)$. Nonostante questo stato sia stato osservato da diversi anni, le sue caratteristiche sono ancora poco conosciute. Verranno presentati nuovi risultati riguardanti la misura delle proprietà di questo stato, basati sul datasample finale dell'esperimento BaBar

Sessione Dottorandi - II / 64

Masse e mixing in modelli grandunificati

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Recently SO(10) models with type-II see-saw dominance have been proposed as a promising framework for obtaining Grand Unification theories with approximate Tri-bimaximal (TB) mixing in the neutrino sector. We make a general study of SO(10) models with type-II see-saw dominance and show that an excellent fit can be obtained for fermion masses and mixings, also including the neutrino sector. To make this statement more significant we compare the performance of type-II see-saw dominance models in fitting the fermion masses and mixings with more conventional models which have no built-in TB mixing in the neutrino sector. For a fair comparison the same input data and fitting procedure is adopted for all different theories. We find that the type-II dominance models lead to comparable or even better fit, but the tight structure of this framework implies a significantly larger amount of fine tuning with respect to other approaches.

Sessione Dottorandi - II / 65

Discovering heavy colored vectors at the LHC

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We performed a study of the LHC discovery reach on composite fermions (top and bottom Kaluza-Klein's) and composite gluon (KKg). We found that the KKg phenomenology is strongly dependent on the ratio between its mass and those of the heavy fermion resonances. When the KKg is below the threshold for the production of a heavy fermion, KKg decays almost completely to top pairs. Until now, this first scenario is the only one studied in the literature on the KKg search at the LHC. There is a high and difficult to reduce QCD background that makes difficult the KKg discovery at the LHC. In the opposite scenario where KKg is heavier than composite fermion pairs, the KKg total decay width becomes too large ($O(\text{TeV})$) to distinguish its resonance from the background. On the other hand, the intermediate scenario where KKg is heavier than a composite fermion but lighter than heavy fermion pairs seems to be very promising for the KKg search at the LHC. This scenario seems to be also the best motivated one according to the hints from the electroweak data, flavor observables and to naturalness arguments. We suggest the KKg decays into a top (bottom) and its heavy partner as the best search channels both for the KKg and the heavy fermions. We found, indeed, that the presence of heavy fermion resonances only in the signal turns out to be very effective to reduce backgrounds.

Sessione Dottorandi - II / 66

A weakly constrained W' at the early LHC

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We study, within an effective approach, the phenomenology of a charged W' vector which transforms as an isosinglet under the Standard Model gauge group. We discuss bounds from present data, finding that these are quite weak for suitable choices of the right-handed quark mixing matrix. Then we study the resonant production at the early LHC of such a weakly constrained W' . We start discussing the reach in the dijet final state, which is one of the channels where the first W' signal would most likely appear, and then we analyse prospects for the more challenging discovery of W' decays into $W\gamma$ and WZ . We show in particular that the former can be used to gain insight on the possibly composite nature of the resonance.

Fisica del Modello Standard ed oltre - II / 67

Preliminary results on Supersymmetric Higgs searches at LHC

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In supersymmetric theories scenarios, the production of neutral Higgs scalars or pseudoscalar particles and their following decay to pairs of tau leptons or b-quarks is greatly enhanced for a large part of the parameters space of the theory, not yet excluded by previous experiments. Preliminary results of the search of this states performed by the CMS experiment at the LHC on the data collected in 2010 are shown.

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NA62: stato dell'esperimento

NA62 is a fixed-target experiment located in the CERN experimental North Area. The beam is provided by SPS. During the first phase (2007->2010) the collaboration measured the ratio $R_K = BR(K \rightarrow e \nu) / BR(K \rightarrow \mu \nu)$. This measurement is sensitive to Standard Model (SM) deviations; in particular it can test lepton universality. The measurement was published in February 2011. During the second phase, the collaboration aims to measure $BR(K^+ \rightarrow \pi^+ \nu \bar{\nu})$. Due to the sensitivity of this BR to new physics, this decay has a strategic role in the search for physics beyond the SM. The hadronic contribution to the uncertainty is small and the SM prediction is precise: $(8.5 \pm 0.7) \cdot 10^{-11}$. The apparatus is under construction and the first run is expected for Spring 2013. The detector status, prototype tests, and signal decay identification sensitivity compared with backgrounds, as well as the first-phase result on R_K , will be discussed.

Fisica del Modello Standard ed oltre - II / 69

Search for charged LFV

Nuove Tecnologie - III / 70

Perspectives of the new GPU Computing technology in the HEP

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Currently, technological solutions being adopted by more manufacturers are bringing to CPU architecture with an even more degree of parallelism, evolving from the multi-core era to the "many-core" era. In this scenario hundreds and, in short, thousands of processing cores, are contained within the same processor. A so deep change in architectural paradigm compels an equally deep change in algorithms and programming paradigms. In this context, the GPU (Graphics Processing Unit) were created to accelerate typical 2D and 3D graphic processing, characterized by an extreme degree of parallelism, containing hundreds of processing cores. Due to their characteristics, these are now used to perform complex calculations also in more general fields. During the talk an introduction to GPU Computing will be presented, providing a small technological outlook on manycore scenarios and a brief introduction on architectures such as CUDA and OpenCL. As first test case we report

performance information obtained with GPU algorithms developed in Perugia in the context of the European project Einstein Telescope (ET) and the INFN project MaCGO (Manycore Computing for Future Gravitational Observatories). Then we report about other algorithms such as Monte Carlo methods, Random Number Generation, particle simulation and some other typical algorithms used in Numerical Physics.

Nuove Tecnologie - III / 71

Integrazione 3d di silicio per rivelatori di vertice

Nuove Tecnologie - III / 72

Development of CVD Diamond Tracking Detectors for Experiments at High Luminosity Colliders

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Diamond was studied as a possible radiation hard technology for use in future high radiation environments. With LHC upgrades expected, all LHC experiments are planning for detector upgrades which require radiation hard technologies. Chemical Vapor Deposition (CVD) diamond has now been used extensively in beam conditions monitors as the innermost detectors in the highest radiation areas of BaBar, Belle and CDF and is installed in all LHC experiments. As a result, this material is now being discussed as an alternative sensor material for tracking very close to the interaction region of the super-LHC where the most extreme radiation conditions will exist.

RD42 collaboration continued making progress in diamond detector technology. Polycrystalline and single-crystal chemical vapor deposition (pCVD and scCVD) diamond detectors were constructed, irradiated and tested. Beam test results of irradiated diamond showed that both pCVD and scCVD diamond follow a single damage curve allowing one to extrapolate their performance as a function of dose.

Nuove Tecnologie - III / 73

Pixel ibridi epitassiali e readout triggerless in tecnologia CMOS 130 nm

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Fisica dei Neutrini / 74

La fisica dei neutrini stato e prospettive

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Fisica dei Neutrini / 75

Esperimenti di oscillazione di neutrini

Fisica dei Neutrini / 76

Neutrino Telescopes

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In recent years the astro-particle community is involved in the realization of experimental apparatuses for the detection of high energy neutrinos originated in cosmic sources or produced in the interaction of Cosmic Rays with the Cosmic Microwave Background. For neutrino energies in the TeV-PeV range, the optical Čerenkov technique is considered optimal. Water (or Ice)-Čerenkov technique is based on the detection of the charged leptons generated in the neutrino charged current weak interactions with the medium surrounding the detector. Those detectors measure the visible Čerenkov photons originated by charged particles propagating at velocities greater than the speed of light through a transparent medium and consist of array of photomultipliers. The charged particle track can be reconstructed measuring the time of arrival of the Čerenkov photons on the photomultipliers.

There are several experiments currently taking data based on the Čerenkov detection technique. The IceCube detector, located in the South Pole, has been recently completed and is now taking data in its final configuration composed of about 5000 photomultipliers; it is the biggest neutrino telescope currently working. ANTARES is an underwater detector composed of about 900 PMTs and is the biggest neutrino telescope operating in the northern hemisphere. There is a European consortium called Km3Net planning to build a kilometer cubic scale detector in the northern hemisphere complementary to the IceCube detector. The consortium is formed around the institutes currently involved in the ANTARES, NESTOR and NEMO pilot projects. Km3Net has recently released a technical design report and is now working to prepare the production phase. An overview of the current status of those experiments will be given.

Fisica dei Neutrini / 77

Decadimento doppio-beta

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Ioni Pesanti / 78

Heavy-ion physics: status and perspectives

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After a brief historical introduction to the aims of the heavy-ion physics and the main lessons from experiments at SPS and RHIC, the contribution deals with the recent results from the first PbPb run at LHC and the nearest future perspectives.

Ioni Pesanti / 79

First Results with the ALICE Experiment at LHC

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Ioni Pesanti / 80

The FRIB's project at LNS: past, present and future

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Ioni Pesanti / 82

SPES

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Ioni Pesanti / 83

Talk teorico

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Fisica Astroparticellare - II / 84

AMS stato dell'esperimento

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Fisica Astroparticellare - II / 85

Astrofisica nucleare

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To understand the physical phenomena occurring in the Universe, including the evolution of stars, e.g. the sun, and the most spectacular events such as the supernovae explosion, an exhaustive knowledge of nuclear and particle physics is mandatory since these phenomena are powered by the interaction among the basic constituents of the matter. Nuclear astrophysics deals with the study of low-energy nuclear reactions with the purpose, among others, to measure the nuclear cross sections to be included in those codes to model the stellar evolution as well as the energy yield in fusion processes. Low energies, <100 keV, are requested for this is the window where these processes are more effective. Two effects have prevented to achieve a satisfactory knowledge of the relevant nuclear processes, namely the Coulomb barrier exponentially suppressing the cross section and the

presence of atomic electrons. These difficulties have triggered theoretical and experimental investigations to extend our knowledge down to astrophysical energies. For instance, indirect techniques such as the Trojan Horse Method and new experimental facilities such as deep underground laboratories (LUNA@LNGS) have been devised yielding new cutting-edge results. In this contribution, I will report on some recent results in the field of nuclear astrophysics to sketch the state of the art in nuclear astrophysics.

Fisica Astroparticellare - II / 86

LHCF

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Fisica dei Saponi Pesanti - II / 87

Oscillazioni del Bs a LHCb

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Fisica dei Saponi Pesanti - II / 88

Fisica dei saponi pesanti in ATLAS

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I dati raccolti nel 2010 hanno consentito all'esperimento Atlas di iniziare lo studio della fisica dei saponi pesanti alle energie raggiunte dal LHC. In particolare saranno mostrate le prime misure con dati da collisione protone-protone a 7 TeV relative alla sezione d'urto di produzione per la J/ψ , osservazione della Y , primi segnali di mesoni D e l'osservazione del decadimento $B^\pm \rightarrow J/\psi K^\pm$. Per tutte queste misure le performance del trigger muonico, della ricostruzione offline dei muoni e del sistema di tracciamento interno risultano di fondamentale importanza. In conclusione saranno poi mostrate le prospettive di misura per la prossima presa dati.

Fisica dei Saponi Pesanti - II / 89

Ricerca di decadimenti rari del B con energia mancante a SuperB

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We present the current experimental status and the perspectives at SuperB on searches for rare B decays with missing energy in the final state. Experimental improvements due to the detector design will be illustrated. The expected constraints on parameters entering New Physics models will also be discussed.

Sessione Dottorandi - III / 90

First ADS result with doubly-Cabibbo suppressed $B^0 \rightarrow D^0 K^0$ modes

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Sessione Dottorandi - III / 91

Operation and performance of the CMS Electromagnetic Calorimeter during the 2010 run

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The operation and performance of the CMS electromagnetic calorimeter (ECAL) during the 2010 run at the LHC, with pp collisions at $\sqrt{s} = 7$ TeV will be reviewed. Pure samples of electrons and photons, mainly coming from decays of known resonances, have been exploited to improve and verify the detector calibration and stability, the reconstruction algorithms and the particle identification efficiency and purity. A thorough review of all these aspects will be given, with particular emphasis on the calibration procedures.

Sessione Dottorandi - III / 92

Ricostruzione di charm and beauty in ATLAS

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The talk will describe the selection of samples of charm and beauty mesons, exclusively or semi-exclusively reconstructed on 7 TeV proton-proton collisions recorded in 2010. These samples have been used for measurements of $c\text{-}\bar{c}$ and $b\text{-}\bar{b}$ production cross section and to calibrate the flavour tagging algorithms (through the selection of pure, or heavily enriched, b and c-jets samples).

Sessione Dottorandi - III / 93

Measurement of the Lepton Charge Asymmetry in Inclusive W Production in pp Collisions at $\sqrt{s} = 7$ TeV

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Lepton charge asymmetry in inclusive $pp \rightarrow WX$ production at $\sqrt{s} = 7$ TeV has been measured by the CMS detector at the LHC, using $36/\text{pb}$ of data. These measurements, performed in both $W \rightarrow e\nu$ and $W \rightarrow \mu\nu$ channels, will provide new insights into proton structure functions.

Sessione Dottorandi - III / 94

Produzione e polarizzazione di J/psi a CMS

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his contribution describes the measurement of J/psi inclusive, prompt and non-prompt cross section using the dimuon channel in the CMS experiment, recently published on EPJC. The analysis is now close to be updated to 40 pb⁻¹ data (the full 2010 statistics) with the inclusion of the psi(2S) cross section. An important contribution to the systematics for this analysis is given by the uncertainty on the prompt J/psi polarization, in particular the detector acceptance is strongly dependent by the leptons' angular distribution. A complex framework for a measure of the J/psi polarization has been developed by the CMS collaboration and a measure of the angular parameters is foreseen for the coming months. A brief description of the main problematics of the polarization measurement is also given.

Sessione Dottorandi - III / 95

Measurement of the inclusive jet cross section in ATLAS

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The data collected in ATLAS at $\sqrt{s}=7$ TeV in 2010, are being used to perform the measurement of the inclusive jet cross section. The processes studied in this measurement are the first giving a glance at the physics at the TeV scale. The presentation will focus on the measurement of the inclusive jet cross section, looking at jets in different rapidity intervals up to very forward regions, with transverse momentum in the interval 0.02-1.5 TeV for central rapidities. The new phase space regions covered by the measurement is important to investigate the presence of new physics, as well as to study the parton distribution functions and the soft non-perturbative part of the interactions. The systematics of the measurement has been widely investigated, and they will be presented. In particular, the impact of the uncertainty on the energy calibration of jets, which is the cause of the dominant uncertainty in the measurement, will be discussed.

Sessione Dottorandi - III / 96

Misura della sezione d'urto del top

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Vengono presentate le sezioni d'urto di produzione del top nel canale dileptonico e nel canale leptone+jet (con e senza richiesta di b-tagging)

Sessione Dottorandi - III / 97

Test of lepton flavour universality in kaon leptonic decays at CERN NA62 experiment

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The ratio of charged kaon leptonic decay rates $BR(K \rightarrow e \nu)/BR(K \rightarrow \mu \nu)$ is suppressed and predicted to excellent precision within the Standard Model. A precision test of lepton flavour universality by measurement of this ratio at the NA62 experiment at CERN, based on a dedicated sample

collected in 2007, is reported. A record accuracy of 0.5% has been achieved. This result constrains the parameter space of new physics models with extended Higgs sector (including supersymmetry).

Sessione Dottorandi - III / 98

Studio della produzione di J/psi e Z in collisioni piombo--piombo a LHC con l'esperimento ATLAS

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Using the ATLAS detector, a centrality-dependent suppression has been observed in the yield of J/psi mesons produced in the collisions of lead ions at the Large Hadron Collider. In a sample of minimum-bias lead-lead collisions at a nucleon-nucleon centre of mass energy $\sqrt{s} = 2.76$ TeV, corresponding to an integrated luminosity of about 6.7 ub^{-1} , J/psi mesons are reconstructed via their decays to $\mu^+\mu^-$ pairs. The measured J/psi yield, normalized to the number of binary nucleon-nucleon collisions, is found to significantly decrease from peripheral to central collisions. The centrality dependence is found to be qualitatively similar to the trends observed at previous, lower energy experiments. The same sample is used to reconstruct Z bosons in the $\mu^+\mu^-$ final state, and a total of 38 candidates are selected in the mass window of 66 to 116 GeV. The relative Z yields as a function of centrality are also presented, although no conclusion can be inferred about their scaling with the number of binary collisions, because of limited statistics. This analysis provides the first results on J/psi and Z production in lead-lead collisions at the LHC.

Sessione di chiusura / 99

Talk di chiusura

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Sessione Poster / 100

A search for Supersymmetric Particles in events with two leptons and Emiss with the ATLAS experiment at the LHC

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The signature characterized by 2 leptons and missing energy offers a very promising venue for the discovery and measurement of Supersymmetry at the LHC.

We present the results of an analysis based on this signature, performed with the data collected in 2010 by the ATLAS experiment.

Special emphasis is given to a technique called 'flavour subtraction', which allows a good control of the backgrounds exploiting the correlations of the flavour of the two leptons in the signal.

Sessione Poster / 102

J/Psi production cross section and non-prompt fraction measurement with the ATLAS detector

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Charmonium studies at hadronic colliders are of interest for probing the still unclear production mechanisms and testing the various theoretical models. The large statistics of J/Psi recorded by the ATLAS detector allows for differential cross section measurements, potentially sensitive to the dominant production processes. The 2010 proton-proton ATLAS data have been used to measure the inclusive double differential cross section as a function of J/Psi transverse momentum and rapidity, in the muon channel. In addition, the fraction of J/Psi coming from long-lived B hadron decays has been determined, thus allowing to extract the direct production cross section. The results and the experimental procedures are presented here with emphasis on the data driven determination of the muon reconstruction efficiency.

Sessione Poster / 103

Misura della produzione del mesone D0 nel canale a 4 corpi in collisioni pp a 7 TeV

Sessione Poster / 104

The performance of the ALICE TOF detector

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The performance of the ALICE Time Of Flight detector (TOF) are presented, based on the 2010 data taking. Hardware status, efficiency, time resolution and PID capability are shown and compared with the design values. First results both in p+p (0.9 and 7 TeV) and Pb+Pb (2.76 TeV) are reported.

Sessione Poster / 105

Sensibility study for B to Invisible(+gamma) decay with the BaBar detector

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We show prospects for research of invisible decays of B meson in a sample of about 470 millions BBbar pairs recorded with the BaBar detector at the SLAC PEP-II B factory. The Standard Model predictions for a B decay with completely invisible final products (or with a single photon as detectable particle) are far from the current experimental sensitivities but several New Physics Models predict significant enhancements on the Branching Ratio of these decays. The analysis technique consists in the reconstruction of a semileptonic B decay on one side and in the search of missing energy or missing energy plus one photon in the recoil.

We'll describe the search techniques and provide the expected sensitivities for these decays.

Sessione Poster / 106

Un rivelatore a straw come tracciatore centrale per l'esperimento Panda

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Significant progresses in fundamental questions of hadronic and nuclear physics could be attained by the PANDA experiment, that will be installed at the international FAIR facility in the site of the GSI laboratory (Darmstadt, Germany). Taking advantage of the physics potential available using the highintensity, phasespace cooled antiproton beams provided by the highenergy storage ring HESR, PANDA will study charmonium and opencharm physics, as well as gluonic excitations and nucleon structure by means of $p\bar{p}$ and $p\bar{p}A$ annihilations.

The rich physics program of the experiment poses significant challenges on the PANDA detector, a fixed target detector consisting in two magnetic spectrometers: the Target Spectrometer and the Forward one. Concerning the Central Tracker, sensitive to the passage of charged particles and providing information about position, momentum and energy deposited, two options are currently under study: one of them foresees the usage of a straw tube tracker, that will be described here. In particular, the main results of the work devoted to the design of this tracker will be summarised; in addition, its performances in terms of geometrical acceptance, momentum resolution and reconstruction efficiency, obtained through the simulation of single track events and physics channels, will be described. Furthermore, experimental results (single tube spatial resolution and dE/dx resolution) obtained with a PANDAlike straw tube prototype will be shown.

Sessione Poster / 108

First observation of charm resonant decay modes in the $\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^- \pi^+$ channel at CDF

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Sessione Poster / 109

Z \rightarrow tau tau production at CMS

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The first measurement of the Z \rightarrow tautau cross-section in the μ -taujet, e-taujet, e- μ and μ - μ final states is presented. The data collected in 2010 with the CMS detector from proton-proton collisions at $\sqrt{s} = 7$ TeV are used, corresponding to an integrated luminosity of about 36 pb⁻¹. The cross section has been measured to be in good agreement with the next-to-next-to-leading order QCD prediction. The production of Z bosons decaying into tau pairs serves as an important benchmark for tau reconstruction and constitutes a reference Standard Model process for searches at the LHC, like the MSSM H \rightarrow tautau.

Sessione Poster / 111

Bose-Einstein correlation in pp collisions at LHC

Bose-Einstein correlations between identical particles are measured in samples of proton-proton collisions at 0.9 and 7 TeV centre-of-mass energies, recorded by the CMS experiment at the LHC.

The signal is observed in the form of an enhancement of number of pairs of same-sign charged particles with small relative momentum. The dependence of this enhancement on kinematic and topological features of the event is studied.

Sessione Poster / 112

Search for new physics with same-sign isolated dilepton events with jets and missing transverse energy at the LHC

The results of searches for new physics in events with two same-sign isolated leptons, hadronic jets, and missing transverse energy in the final state are presented. The searches use an integrated luminosity of 35/pb of pp collision data at a centre-of-mass energy of 7 TeV collected by the CMS experiment at the LHC. The observed numbers of events agree with the standard model predictions, and no evidence for new physics is found. To facilitate the interpretation of our data in a broader range of new physics scenarios, information on our event selection, detector response, and efficiencies is provided.

Sessione Poster / 113

Measurement of the Underlying Event Activity at the LHC with $\sqrt{s} = 7$ TeV and Comparison with $\sqrt{s} = 0.9$ TeV

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First measurement of the underlying activity in proton-proton collisions at $\sqrt{s} = 7$ TeV compared with 900 GeV is presented, using data collected by the CMS experiment at the LHC in 2009/2010. The Multiple Parton Interaction rate, the main component of the Underlying Event activity, and its energy dependence is studied measuring the charged multiplicity and the charged energy density in a region perpendicular to the plane of the hard 2-to-2 scattering. The direction of the hard scattering and the energy scale of the event is found using of the leading track-jet. Corrected results are presented, unfolding the detector effects to directly compare with Monte Carlo models predictions.

Sessione Poster / 114

Standard Model Tests with T2K and other Neutrino Superbeams and by means of Liquid Argon Detectors

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Very high intensity accelerator neutrino beams are becoming available. Designed for experiments investigating neutrino mixing and leptonic CP violation, they will offer, at the same time, the opportunity to perform precision tests of the Standard Model and extract values of the parameters (Weinberg angle) in the medium and low energy region, checking the consistency with the high energy data coming from colliders. We studied in detail the potentialities of the superbeams, with particular attention to the T2K experiment, already running in Japan. The golden channel is the quasi elastic scattering of neutrino on nucleons and the ideal detector would be a liquid argon one. Therefore, our analysis could have applications also to other possible future experiments (like the proposal for neutrino experiments with the CERN-PS beam and ICARUS detector).

Sessione Poster / 115

Misure di fisica nucleare per applicazioni in adroterapia

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Sessione Poster / 116

Using W-charge Asymmetry to Measure W-production

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The production of W-bosons in pp-collisions is charge symmetric. At the LHC the asymmetry is theoretically very well predicted and can be used as an input to the measurement of the production cross-section of W-bosons in association with other particles for final states in which the contribution from other processes is largely charge symmetric. We describe the use of this method to measure the W+jets background to $t\bar{t}$ production in the single lepton plus jets channel. We describe the main systematic uncertainties associated to this technique.

Sessione Poster / 117

Ricerca di Particelle a Lunga Vita Media nel rivelatore ATLAS

A number of extensions of the Standard Model result in neutral and weakly-coupled particles that decay to multi hadrons or multi leptons with macroscopic decay lengths. These particles with decay paths that can be comparable with ATLAS detector dimensions represent, from an experimental point of view, a challenge both for the trigger and for the reconstruction capabilities of the ATLAS detector. We will present first results from the searches performed by the ATLAS detector using data collected in the 2010 LHC run, and the analysis strategies and limits on the production of such long-lived particles that can be achieved with the statistic that ATLAS expects to collect in 2011/2012.

Sessione Poster / 118

Misura della sezione d'urto di produzione dello Z in elettroni in collisioni protone-protone a $\sqrt{s} = 7$ TeV con il rivelatore ATLAS a LHC

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In questo report verrà presentata la misura della sezione d'urto inclusiva di produzione del bosone Z osservato nel canale di decadimento in due elettroni ad una energia pari a $\sqrt{s} = 7$ TeV in collisioni protone-protone. La misura è stata effettuata con i dati raccolti dall'esperimento ATLAS ad LHC corrispondenti ad una luminosità integrata di circa 34 pb⁻¹.

Sessione Poster / 119

Jet-energy scale calibration using gamma-jet events in the ATLAS experiment

Sessione Poster / 120

The Kaon identification detector for the NA62 rare Kaon decay experiment at CERN

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The NA62 experiment at the CERN SPS aims to collect about 100 events of the ultra rare Kaon decay $K^+ \rightarrow \pi^+ \nu\bar{\nu}$, with a Signal to Background (S/B) ratio of 10:1. The main purpose is the measurement of the Branching Ratio of the decay with a 10% accuracy. NA62 will use an unseparated charged beam with Kaon decays in flight technique. Pions and protons cannot be separated efficiently from Kaons at the beam level. To make a positive identification of the $\sim 6\%$ of Kaons in the high rate environment (~ 800 MHz) before they decay a Hydrogen gas-filled differential Cherenkov counter (CEDAR) is placed in the incoming beam. The counter will be insensitive to pions and protons and it will give precise timing to reconstruct the $K^+ \rightarrow \pi^+ \nu\bar{\nu}$ decay. The CEDAR detector is required to achieve a Kaon tagging efficiency of at least 95% with a time resolution of at least 100 ps.

Sessione Poster / 121

Kaon-nuclei interaction studies at low energies (the AMADEUS experiment)

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The AMADEUS experiment aims to perform dedicated precision studies in the sector of low-energy kaon-nuclei interaction at the DAΦNE collider at LNF-INFN. In particular, the experiment plans to perform measurements of the so-called (very debated) deeply bound kaonic nuclei and, if existent, to measure their properties (binding energies and widths) by using the process of stopped kaons in cryogenic gaseous targets (He^3 and He^4). AMADEUS will measure all particles coming from negative kaons stopped in these targets, so performing a full study of various interaction channels. Other important measurements proposed by AMADEUS are the low-energy interaction studies of negative kaons in various targets. The kaon beam is ideal (low-energy kaons from the ϕ -decay at DAΦNE) and the setup, an implementation in the central region of the KLOE detector with dedicated additional items, is having very good performances (high acceptance and capacity to measure charged and neutral particles with excellent resolution). The results of AMADEUS will give a boost to the sector of non-perturbative QCD in the strangeness sector. The physics program, preliminary results from analysis of KLOE data and future plans will be presented.

Sessione Poster / 122

Analysis strategy for the Higgs boson search in the four lepton final state in CMS

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The current status and future prospects for SM Higgs boson searches in the $H \rightarrow ZZ(*) \rightarrow 4e$ ($e = e, \mu$) channel with the CMS detector are presented. The whole analysis strategy for rejecting the backgrounds while keeping very high signal efficiencies is discussed, with a particular emphasis on the usage of data-driven techniques and on the estimation of systematic uncertainties. Preliminary results from analyses on the real data collected so far are also shown.

Sessione Poster / 126

Studio dei decadimenti $B^{\pm} \rightarrow p \bar{p}$ a LHCb

Lo studio del canale di decadimento $B^{\pm} \rightarrow p \bar{p}$ a LHCb offre l'opportunità sia di osservare stati del charmonio in $p \bar{p}$ sia di misurare possibili effetti di violazione CP nel Dalitz plot. Nella presentazione verrà descritta la strategia utilizzata per la selezione degli eventi a LHCb. Verranno quindi discussi alcuni risultati preliminari sulla sensibilità attesa nelle varie misure di interesse fisico a cominciare dai branching ratio degli stati del charmonio.

Sessione Poster / 127

Statistical Methods for point-like neutrino searches

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The KM3Net consortium aims at the construction of an underwater research infrastructure hosting a telescope for high energy neutrino located in the Mediterranean sea.

The telescope performance, which consists in the estimate of the sensitivity and discovery fluxes, is estimated by means of Monte Carlo simulations.

Moreover, different statistical analysis can be applied in order to analyze the fluctuations of the atmospheric neutrino background and detect an excess due to neutrino from galactic and extra-galactic sources.

The statistical methods and the results will be presented.

Sessione Poster / 129

Misura di Drell-Yan a COMPASS-II

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Il processo Drell-Yan puo' essere utilizzato per avere accesso alle funzioni di struttura del nucleone dipendenti dal momento trasverso dei partoni (TMD PDF), come le funzioni di Boer-Mulders, di Sivers e la funzione di trasversita'. Le informazioni, ottenute dallo studio di eventi Drell-Yan, permettono un confronto con le evidenze provenienti da esperimenti di diffusione profondamente anelastica semi-inclusiva (SIDIS). L'esperimento COMPASS al CERN permettera' di studiare eventi Drell-Yan indotti da un fascio di pioni incidente su un bersaglio di protoni trasversalmente polarizzati.

Sessione Poster / 130

Gamma Astronomy with ARGO-YBJ

ARGO-YBJ is an extensive air shower detector located at the Yangbajing Cosmic Ray Laboratory (Tibet, China) at 4300 m a.s.l. It is made by a full coverage carpet plus a guard ring (total surface ~ 6700 m²) of Resistive Plate Chambers grouped into 153 units called "clusters". The experiment has continually worked since November 2007 recording events with an energy threshold of ~ 300 GeVs and with a duty cycle of $\sim 90\%$. The lowest energy threshold (few GeVs) is obtained using the "scaler operation mode" counting events for every cluster with a number of particles ≥ 1 , ≥ 2 , ≥ 3 , ≥ 4 , in order to detect cosmic rays flux variations and gamma-ray bursts. Its structure and the high altitude allow exhaustive studies of gamma astronomy with similar energy range of Cherenkov telescopes. This talk emphasizes the results of ARGO-YBJ in gamma astronomy. In particular the TeV emissions of the blazar Markarian 421, the analysis of its last two flares in 2008 and 2010 and the comparison of the Cherenkov telescopes ones are presented and discussed.

Sessione Poster / 131

Misura del flusso dei neutrini solari Be7 a 862keV e assenza dell'asimmetria giorno-notte in Borexino

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L'esperimento Borexino è in presa dati da maggio 2007 ed è l'unico esperimento in grado di misurare in tempo reale il flusso di neutrini solari di bassa energia (MeV o inferiore al MeV). Recentemente ha realizzato la misura del flusso dei neutrini del Be7 con elevata precisione (5%), migliorando sensibilmente l'accuratezza della misura già pubblicata da Borexino stesso.

Nella presentazione verranno illustrati i risultati della campagna di calibrazione e le procedure di analisi dei dati che hanno permesso di ottenere questo risultato. Infine verranno discusse le sue implicazioni nell'ambito della fisica delle oscillazioni dei neutrini.

Sessione Poster / 132

Rivelazione di fotoni singoli con contatori basati su Thick GEM

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I rivelatori di fotoni a gas basati su MPGD (MicroPattern Gaseous Detector) rappresentano la nuova generazione di rivelatori di fotoni basati sul principio dei contatori a gas.

In questo contributo si relaziona sullo stato di un programma di R&D dedicato allo studio degli aspetti di principio e dell'ingegnerizzazione di contatori basati su Thick GEM (THGEM), moltiplicatori di elettroni derivati dalle GEM usando la tecnologia dei circuiti stampati.

Il fotorivelatore è realizzato con uno schema multistrato di THGEM, applicando un film di fotoconvertitore (CsI) sulla faccia esterna del primo strato.

In particolare si discutono la stabilità temporale della risposta dei moltiplicatori e i criteri di ottimizzazione nella scelta dei parametri geometrici ed operativi. La recente osservazione della dipendenza della risposta temporale dal campo elettrico alla superficie del fotoconvertitore offre una tecnica efficace e veloce per diagnosticare l'efficienza di estrazione dei fotoelettroni dal fotoconvertitore