CSN5

R&D Activities @ INFN-LNF:

Budget & Resources for 2015

Simone Dell'Agnello, CSN5-LNF Coordinator

Meeting for Budget 2015, LNF, 01-07-2014

Outline

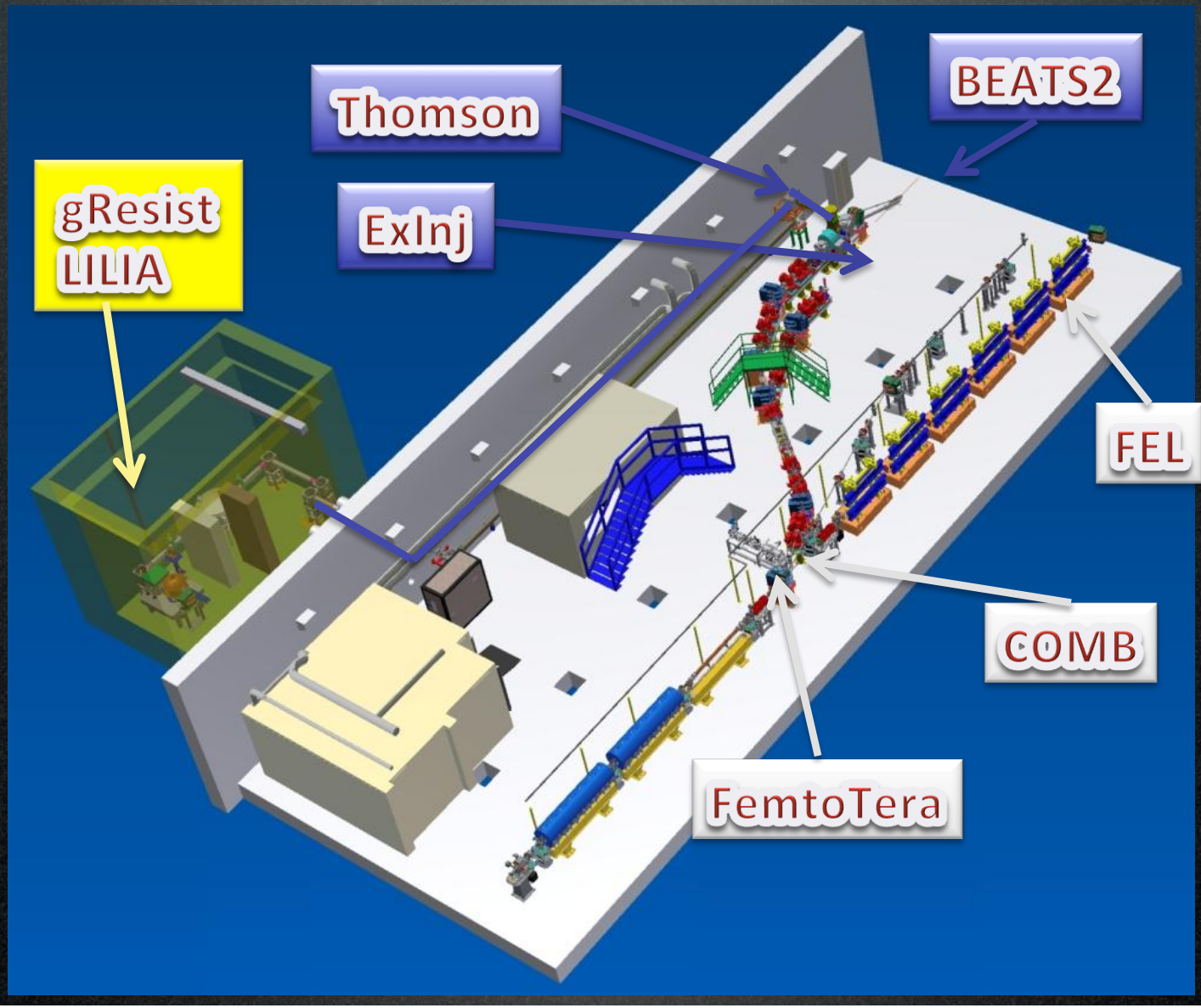
- CSN5 Experiments/Grants/Calls
  - Highlights
  - FTEs & Requests to LNF Services
  - Estimates for Requests to CSN5 (if available)
- CSN5 Summary & News

CSN5 Experiments/Grants/Calls

Experiment	**R&D Area**	**Nat. Resp. (or *local*)**	**FTE** (tbc)
SL-COMB	Acceler.	M. Ferrario	4.3
SL-EXIN	Acceler.	G. Di Pirro(*l*)	2.1
SL-FEMTOTERA	Acceler.	E. Chiadroni(*l*)	2.6
IMCA	Acceler.	Cimino/Larciprete(*l*)	4.0
NORCIA	Acceler.	G. Gatti/B. Spataro	2.9(2.6)*
ETRUSCO-GMES	Interdisc.	S. Dell'Agnello	9.6
RDH	Interdisc.	E. Spiriti(*l*)	2.1
SQUARE(Call new)*	Interdisc.	D. Di Gioacchino	5.1
IR_DET (Exp new)	Detec./El.	A. Drago	1.3
NEURAPID	Detec./El.	R. Bedogni	2.2
E-LIBANS (Exp. new)	Detec./El.	R. Bedogni(*l*)	0.9
GARFIELD (Grant)	Detec./El.	A. Di Gaspare	3.4
BEAM4FUSION	Detec./El.	F. Murtas(*l*)	2.1(0.0)**
ARDESIA (Exp. new)	Detec./El.	A. Balerna(*l*)	2.0
PIM (Call new)**	Detec./El.	G. Bencivenni(*l*)	4.2

ARDESIA, PIM: see talks. BEAM4FUSION: linked to PIM, no input received

SL_COMB 2015

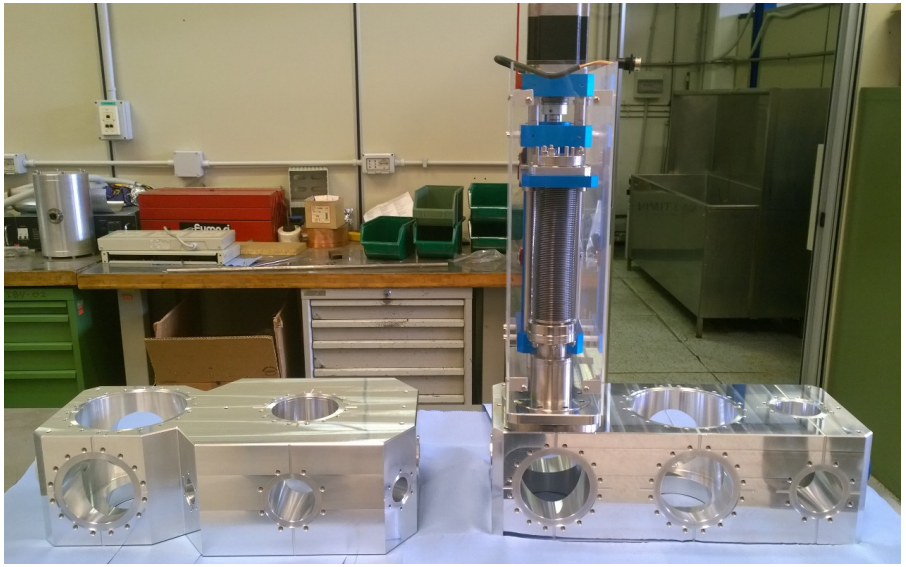


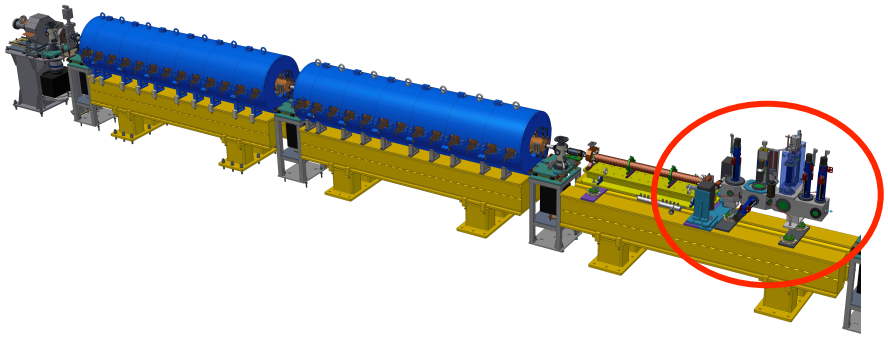
SL-COMB

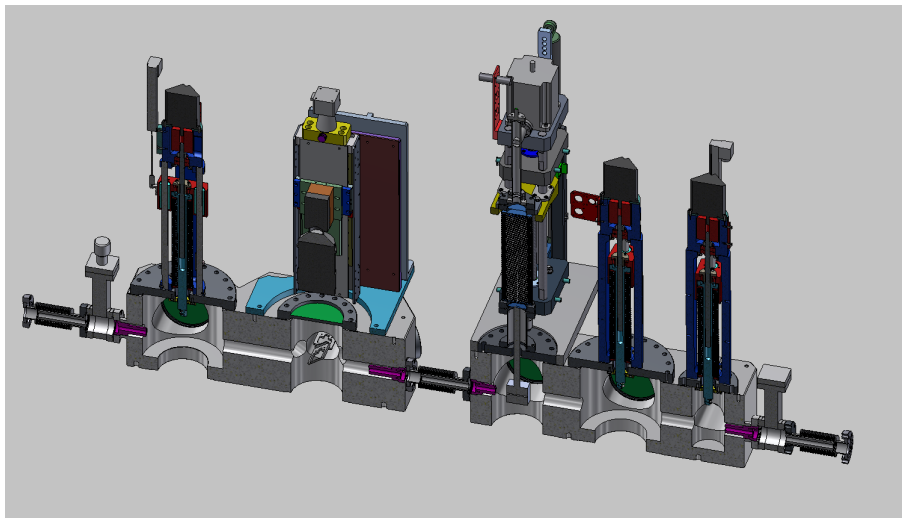
2015 work to do

- Installazione on line della camera di interazione fascio/plasma
- Start to end simulations (GPT+QFLUID+ALADYN)
- Generazione e caratterizzazione treno di fascio di elettroni
- Sviluppo ottica di cattura fascio accelerato (Plasma Lens?)
- Sviluppo diagnostica per fascio estratto e per plasma

COMB interaction chamber delivered!







SL-COMB, Richieste CIF x 2015:
6 man-months
(extrapolated from 2014 – see below)

Summary Richieste CIF x II semestre 2014

- Tecnico del vuoto per test off line della camera di interazione
- Progettista meccanico per design supporti movimentazione e qudrupoli
- Tecnico per realizzazione alimentatore/ impulsatore per pilotare la scarica nel gas

SL-COMB, Team: 4.3 FTE

1	**Anania Maria Pia**	Dipendente	Ricercatore	CSN V	**20**
2	**Ferrario Massimo**	Dipendente	Dirigente di Ricerca	CSN V	**40**
3	**Gatti Claudio**	Dipendente	Ricercatore	CSN I	**20**
4	**Gatti Giancarlo**	Dipendente	Ricercatore	CSN V	**20**
6	**Ronsivalle Concetta**	Associato	Primo Ricercatore	CSN V	**20**
7	**Villa Fabio**	Dipendente	Ricercatore	CSN V	**50**
8	**Ciocci Franco**	Associato	Ricercatore	CSN V	**20**
9	**Romeo Stefano**	Associato	Dottorando	CSN V	**100**

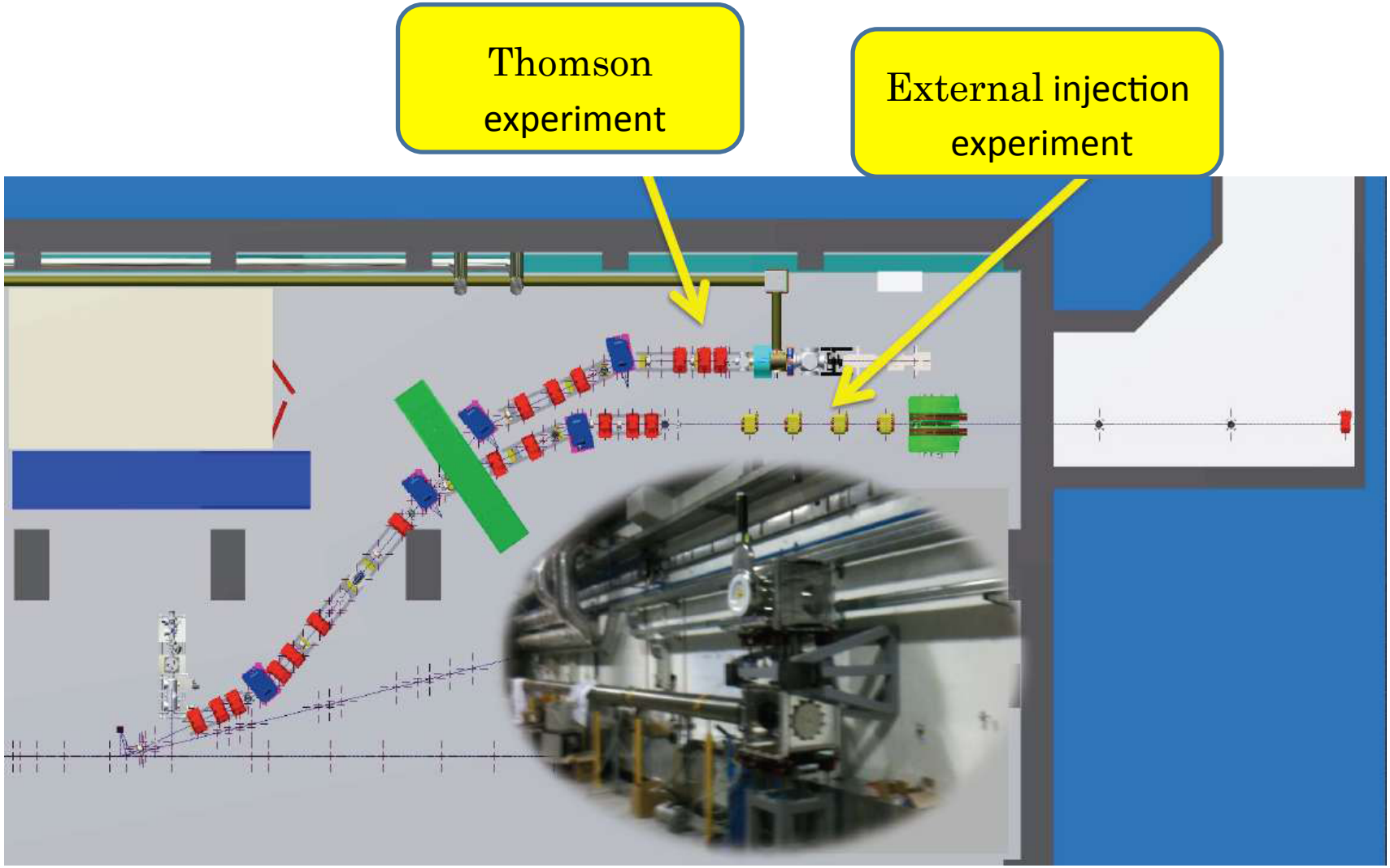
Tecnologi

	Nome	Età	Contratto	Qualifica	Aff.	%
1	**Alesini David**		Dipendente	Primo Tecnologo	CSN V	**10**
3	**Di Giovenale Domenico**		Dipendente	Tecnologo	CSN V	**20**
4	**Di Pirro Giampiero**		Dipendente	Primo Tecnologo	CSN V	**10**
5	**Gallo Alessandro**		Dipendente	Dirigente Tecnologo	CSN V	**20**
6	**Pompili Riccardo**		Associato	Assegnista	CSN V	**30**
7	**Spataro Bruno**		Associato	Ass.Senior	CSN V	**10**
8	**Vaccarezza Cristina**		Dipendente	Primo Tecnologo	CSN V	**30**
9	**Bini Simone**		Dipendente	Tecnologo	CSN V	**30**
10	**Del Franco Mario**		Dipendente	Tecnologo	CSN V	**30**

Richieste finanziarie LNF x 2015

Items	Costo (kEuro)
Missioni	7
Tripletto di quadrupoli per matching fascio/plasma	30
Alimentatori per quadrupoli	20
TOTALE	**57**

SL-EXIN
SPARC bunker layout



SL-EXIN: Milestones 2014

- **Complete Simulations for injection and acceleration in capillary**
- **Design electron diagnostic**
- **Design and implementation of the capillary holder**
- **Complete Design of Interaction Chamber and ready for installation (Dec 2014)**

SL-EXIN: Milestones 2015

- **Installation Interaction Chamber**
- **Complete Design diagnostic and realizzation**
- **September 2015 ready for experiment**

SL-EXIN: Richieste CSN5

- **40 Keuro completamento diagnostiche fascio elettroni e laser**

SL-EXIN: Personale

- **CIF: 2 mesi-uomo x Supporto servizi Divisione Acceleratori per installazione e completamento realizzazione diagnostica fascio di elettroni prodotto**
- **Anagrafica**

	Contratto	Qualifica	%
Anania Maria Pia	Dipendente	Ricercatore	30
Di Giovenale Domenico	Dipendente	Tecnologo	20
Di Pirro Giampiero	Dipendente	Primo Tecnologo	50
Gallo Alessandro	Dipendente	Dirigente Tecnologo	20
Gatti Giancarlo	Dipendente	Ricercatore	20
Ronsivalle Concetta	Associato	Primo Ricercatore	30
Tomassini Sandro	Dipendente	Tecnologo	20
Vaccarezza Cristina	Dipendente	Primo Tecnologo	10
Villa Fabio	Associato	Assegnista	30
			FTE:2.1

FemtoTera 2013-2015

Coordinatore nazionale: *S. Lupi* (Roma 1)

Sezioni proponenti:

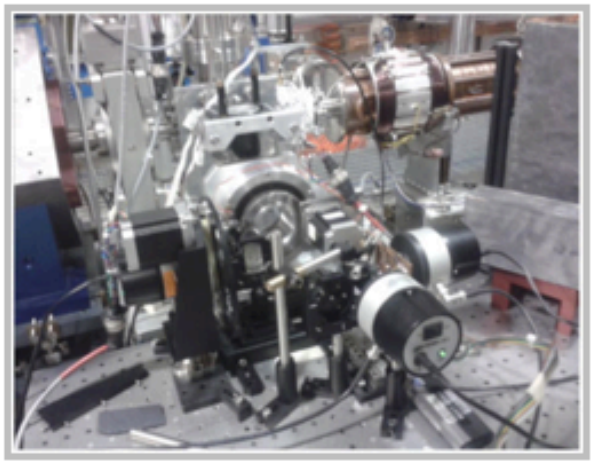
Roma 1 (*S. Lupi, F. Giorgianni, M. Autore, M. Migliorati, P. Antici*), **1.8 FTE**

LNF (*E. Chiadroni, M. Castellano, M. Cestelli Guidi, M. Daniele, M. Ferrario, G. Gatti, A. Nucara)* ***2.6 FTE***

Torino *(B. Minetti, G. Ghigo, R. Gerbaldo, L. Gozzelino)* ***1.5 FTE***

LNS *(R. Papaleo, A. Rovelli)* ***1 FTE***

A SPARC_LAB il primo studio degli isolanti topologici con radiazione terahertz



A SPARC_LAB il primo studio degli isolanti topologici con radiazione terahertz

Presso la test facility SPARC_LAB dei Laboratori Nazionali di Frascati (LNF) dell'INFN, è stata recentemente realizzata una sorgente di radiazione nella regione del terahertz (THz) intensa, stabile, estesa in frequenza e con durata temporale al di sotto del picosecondo.

FTE @ LNF

E. Chiadroni (Resp. Locale)	30%
M. Ferrario (Dir. Ricerca)	10%
M. Daniele (PhD Student)	100%
M. Cestelli Guidi (Art. 23 Tecnologo)	40%
A. Nucara (Associato)	40%
G. Gatti (Ricercatore)	20%
C. Ronsivalle (Ass. I Ricercatore)	20%
Tot. FTE	**2.6**

RICHIESTE SERVIZI 2015

Supporto tecnico: officina, servizi di vuoto e impianti:
1 mese uomo
Servizi Elettronici e Informatici:
1 mese uomo

RICHIESTA CSN5@LNF 2015: 46 kEur

"CPGEM"
arie Curie Initial Training Netv

"Charged Particle Generated Electromagnetic fields and radiation"

Letter of Intent

EUROPEAN COMMISSION

7 th Framework Programme for Research

Abstract:
The CPGEM ITN will create a foundation for collaborative research, training through research, industrial connections and outreach activities. The network will form a centre of excellence for advanced and novel methods of electromagnetic radiation generation, transportation and detection. Together we shall develop a strong research programme at the forefront of the EM radiation science. A friendly and supportive

Network Coordinator
Dr. Pavel Karataev
Royal Holloway, University of London

Evaluation Result

Total score: 89.20% (Threshold: 70/100.00)

Quality

Overall comments

This proposal is overall very good in this criterion. The research programme has strong multidisciplinary and inter-sectorial components, is innovative and timely with the needs of the field. The private sector participates at the highest possible level. The identified weaknesses are related to the network added value of the proposed research programme and state-of-the-art description.

Implementation

Re-submitted in H2020

Overall comments

The network participants have the capacities to achieve the planned research training programme, with evidence of commitment of the private sector partners and detailed description of the network management plan.

IMCA

Innovative Material and Coatings for Accelerators

Unità INFN-LNF

R. Cimino* (80%) (Resp.Nazionale),

A. Balerna (20%), E. Bernieri (20%),

M. Biagini (10%) , S. Guiducci (10%),

A. Romano (100%), A. Di Trolio (100%)

R. Larciprete (80%) (Resp. Locale)

* presently works on the IMCA project at CERN

Unit INFN- Uni Napoli

UnitINFN - Uni Sapienza Roma

Unit INFN – Uni Salerno

The national Project has in total ~ 9 FTE.

International collaborations: CERN, SLAC, ANKA, DESY, Cornell, RICH, Bessy 2

THERE IS NO RESOURCE REQUEST TO LNF

IMCA- Highlights

- Evolution of the secondary electron emission during the graphitization of thin C films
- Evaluation of commercial Cu foams in terms of secondary emission and behaviour in vacuum, in view of possible integration in accelerator systems
- Effects of lattice defects on the secondary emission properties in graphite
- Study of the low energy SEY of metal surfaces

IMCA - Requested budget for 2015

Travel related expenses Experiment at external laboratories, scientific meetings with collaborating groups, committee meetings, national and international conferences **15 Keuro**

Consumables
Vacuum components, substrates, processing gases, evaporation materials **25 Keuro**

Equipment building
Contribution to integrate the **recently acquired STM microscope (Scanning Tunneling Microscope)** into the set-up dedicated to the growth and XPS analysis of thin film samples. Such an implementation will allow the samples of interest for IMCA to be characterized by tunneling microscopy, expanding the information achievable to the knowledge of the surface structure, defect density, interaction with adsorbates, etc. The requested budget is necessary for up-grading the manipulators and the sample holders in the UHV chambers and for the modification of the sample transfer systems. **40 Keuro**

New equipment.
Implementation of a pumping system for the UHV chamber of the STM microscope. **8 KEuro**

Maintenance
Contribution to the maintenance of the UHV cryostat. **5 Keuro**

Budget						
	Travelling	Consumables	Equipment building	New equipment	Maintenance	Total
LNF	**15**	**25**	**40**	**8**	**5**	**93**

NORCIA

NOvel Researches Challenges In Accelerators
(*Responsible* G. Gatti)

http://www.lnf.infn.it/gr5/website_norcia/home.html

New technologies are necessary to achieve the multi-TeV energies required by the next linear e^+/e^- colliders, ν facilities, x-ray FELs, etc.

The proposal is then devoted to the R&D of key components for existing accelerators and for next generation of accelerators

- **RF cavities**
  Multi-TeV linear colliders require RF high-frequency and high-power with accelerated gradients >120 MeV/m

NOvel Researches Challenges In Accelerators

http://www.lnf.infn.it/gr5/website_norcia/home.html

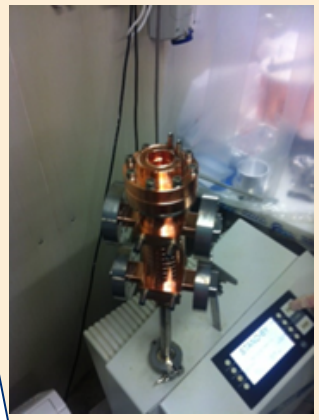
NORCIA

11.424 GHz prototypes

Molybdenum brazed

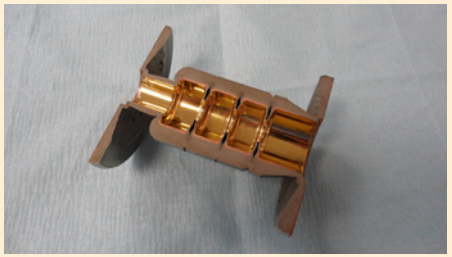
Cu electroplated

Novel hybrid gun



Highlights CSN5 !

Au-Ni electroformed cavity (whole)



Au-Ni electroformed cavity (cross section)

Ni electroformed structure with cooled irises

FTE Norcia

INFN/LNF		FTE : 3.6	
B. Spataro	50 %	LNF	Dir. Tecnologo
D. Alesini	20 %	LNF	Primo tecnologo
M. Zobov	20 %	LNF	Dir. Tecnologo
M. Ferrario	10 %	LNF	Dir. Ricerca
G. Gatti	10 %	LNF	Ricercatore
D. Gioacchino	100 % / 0% (partecipa a Call)	LNF	Ricercatore
N. Saini	50 %	LNF	P.O. (associato)
R. Gunnella	50 %	LNF	P.O. (associato)
G. Della Ventura	50 %	LNF	P.O. (associato)

Richieste CSN5

139 k€ Consumo

4.0 k€ Invent.

27 K€ (LNF) missioni

FTE di LNL e Roma1 : INFN/LNL : 2.6 ; INFN/Roma1 : 0.6 ;

CIF: INFN-LNF NO REQUEST

A.R. 2 ANNI SU "COMPACT HIGH GRADIENT SECTIONS" FINANZIATO DALLA PRESIDENZA, RICHIESTO AL DIRETTORE TRAMITE COORDINATORE CSNV

Collaborations: SLAC(USA)-UCLA(USA)-KEK(J)-Diamond(UK)-Desy(D)-USTC/NSRL/China) in progress

ETRUSCO-GMES @ SCF_Lab

SCF_Lab

Satellite/Lunar/GNSS laser ranging and altimetry Characterization Facilities Laboratory

- R&D and Technological Services
- Geometrodynamics/Georeferencing
  - **Laser Retroreflectors for Satellite & Ground Segments**
- General Relativity and beyond
- Earth Observation
  - Copernicus (H2020), COSMO-SkyMed
- GNSS (H2020), Space Geodesy

CSN5-area SCF_Lab approved Projects

ETRUSCO-GMES (INFN-CSN5, 2013-15)

Unification of Galileo & Copernicus (G€ H2020 Flagships)

G-CALIMES (Contract Ministry of Defense-INFN, 2013-16)

Unification of Galileo, COSMO-SkyMed 1st & 2nd Gen

AUGUSTUS-2014 (Contract MAE-INFN, 2014-2015)

Italy-USA project on Earth Observation

Laser Ranging to Galileo (Premiale MIUR-ASI-INFN, 2014-16)

*New proposals **ETRUSCO-3**, devoted to optical satellites, being submitted to Defense and Israel Aerospace Industries*

Team and Requests

- Total: **~10 FTE**
- Requests to LNF Services
  - SPCM: 7 mo
  - Automation: 5 mo
  - Cryogenics: 2 mo
- Requests to CSN5: ~100 k€

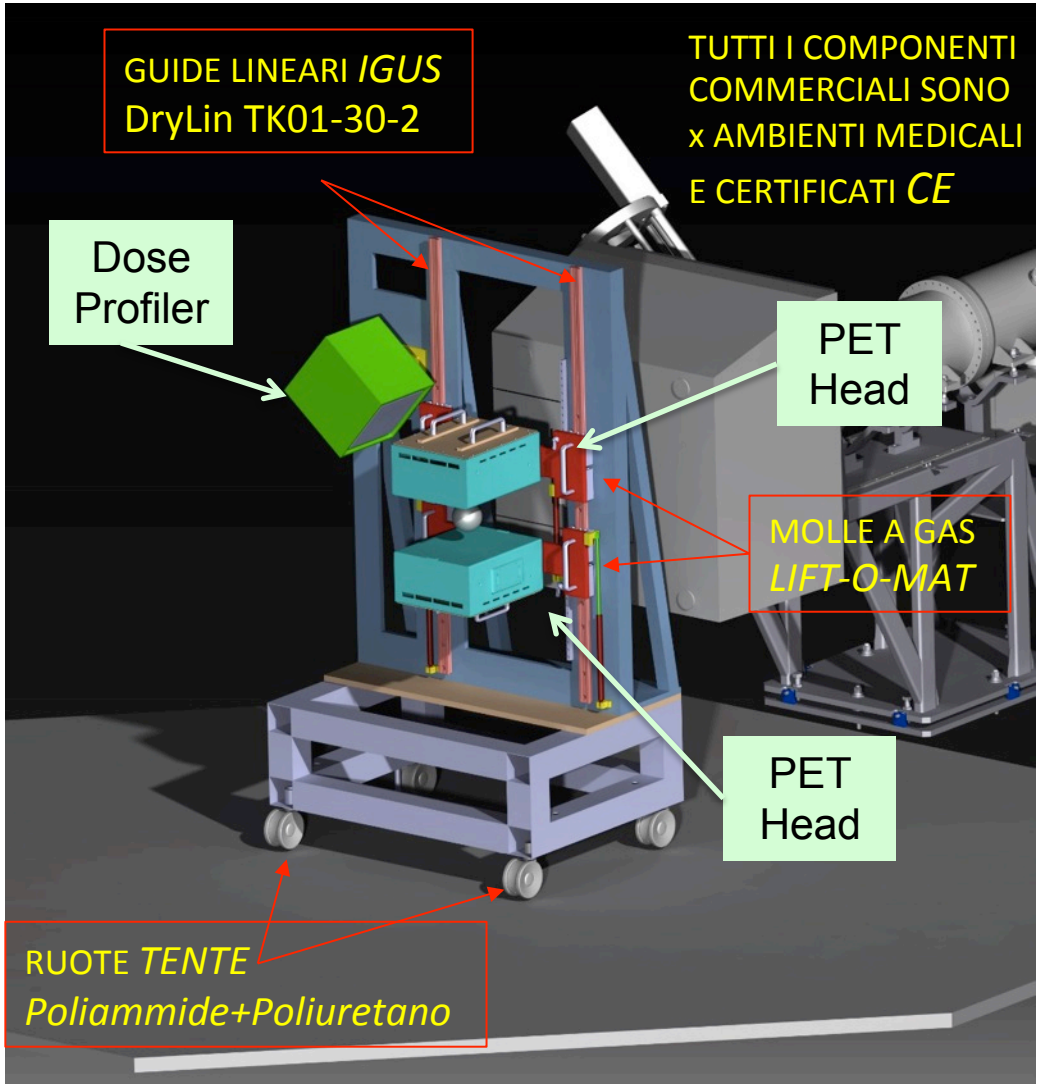
SCF_Lab

ETRUSCO-GMES: 9.8 FTE

Bellettini Giovanni	30%
Dell'Agnello Simone	30%
Delle Monache	50%
Giordano Patrizi	100%
Maiello Mauro	50%
Emanuele Ciocci	30%
Contessa Stefania	100%
Alessandro Boni	100%
Claudio Cantone	100%
Porcelli Luca	50%
Tauraso Roberto	30%
Vittori Roberto	40%
Nicola Intaglietta	30%
Mattia Tibuzzi	50%
Salvatori Lorenzo	100%
Alessandro Stecchi	20%
Enrico Bernieri	20%
To be associated, also for Premiale MIUR "Laser Ranging to Galileo"	
Pippo Bianco (ASI)	50%

RDH (**R**esearch and **D**evelopment for **H**adrontherapy) & INSIDE (prin) @CNAO

- The WP5 of RDH and the PRIN project INSIDE cooperate to build a multi-modal dose monitor in operation at CNAO
- The device exploit β^+, prompt charged and prompt photon flux generated by the interaction of the beam in the patient
- LNF in charge of the Dose Profiler electronics readout



Percentuali 2015 RDH: Total 2.1 FTE	
De Lucia Erika	20%
Iarocci Enzo	0%
Mattei Ilaria	100%
Paoloni Alessandro	10%
Sarti Alessio	30%
Spiriti Eleuterio	50%

- Disegno del layout e test di scheda a campionamento analogico
- Realizzazione meccanica supporto rivelatori per test sul fascio presso il Ciclotrone dei LNS (si aspetta riassegnazione tempo fascio a seguito del guasto al liquefattore dell'Elio dell'anno scorso)

Necessità stimate per i servizi LNF nel 2015

Totale richieste stimate SEA	**7/8 mesi uomo**
Totale richieste stimate Officna Meccanica	**2 mesi uomo**

SQUid ARrays for Emerging applications (SQUARE)

LNF, ……. *Supracon (Germany)*

Contacts in progress: sez. INFN Genova, sez. INFN Roma, Univ. Roma, *RICMASS,……*

CALL Project Proposal for 2015

Commissione Scientifica Nazionale 5

Istituto Nazionale Fisica Nucleare

The goal of this 3 years project is:

- ***the design and the fabrication of SQUID arrays to map magnetic microstructures in a material***

to improve

- **superconductor *materials*, magnetic materials, for technological applications of interest for the INFN**
- ***to realize new particle detectors with a lower energy threshold for applications where an extremely small quantum energy is involved***

SQUid ARrays for Emerging applications (SQUARE)

SQUIDS are extremely sensitive magnetic flux detectors used as low-noise current-to-voltage amplifiers in many cryogenic applications to perform ultra low-noise magnetic field measurements. Because they do not dissipate current they are used for measuring currents in superconducting circuits. Moreover, because they also dissipate a very low power they may be integrated with detectors when a low dissipation and a high speed are mandatory requirements.

An increasing interest has been recently devoted to the R&D of SQUIDs suitable to investigate small spin systems or even to detect a single spin flips. Attempts have been done for the development of nm-size SQUID sensors that may achieve the highest sensitivities. At present the use of conventional Josephson tunnel junctions is not possible, because, they are commonly fabricated in the so-called window-type technology, which has several drawbacks. Actually, the size of these junctions, which can be reproducibly fabricated, is in the range of a few micrometres a value that obviously rules out the fabrication of SQUIDs with a loop diameter of 1 μm or less.

INFN Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Frascati

Dipartimento di Fisica
Sapienza Università di Roma

SQUid ARrays for Emerging applications (SQUARE)

The project will foresee

1. R&D of a 4X4 SQUID array prototype
2. R&D of the read-out electronics with analysis of the distortion of the local magnetic field to be measured and the cross talk among channels
3. The possibility that the SQUID Array sensing system either will be alone or coupled to the pickup loops to create XY mappings with gradiometers.
4. Assembly the SQUID with an appropriate cryogenic system to connected to a vacuum system for X-Y micro-motion of the sample
5. Study the coupling of different films with the array of SQUID sensors regarding the possible uses in the field of particle detection
6. …..

SQUid ARrays for Emerging applications (SQUARE)

This activity at the LNF will take place in the laboratory
LAMPS

LNF Research teams

LNF (5 FTE)

D. Di Gioacchino (resp.)

A. Marcelli

G. Della Ventura (ass LNF)

R. Gunnella (ass LNF)

N. Saini (ass LNF)

SUPRACON (Germany)

Vyanceslav Zakosarenko SUPRACON

Altre sezione in progress

Richieste 2015-2017

Circa 1000 KEuro

personale tecnico della divisione ricerca
(da discutere)

SQUid ARrays for Emerging applications

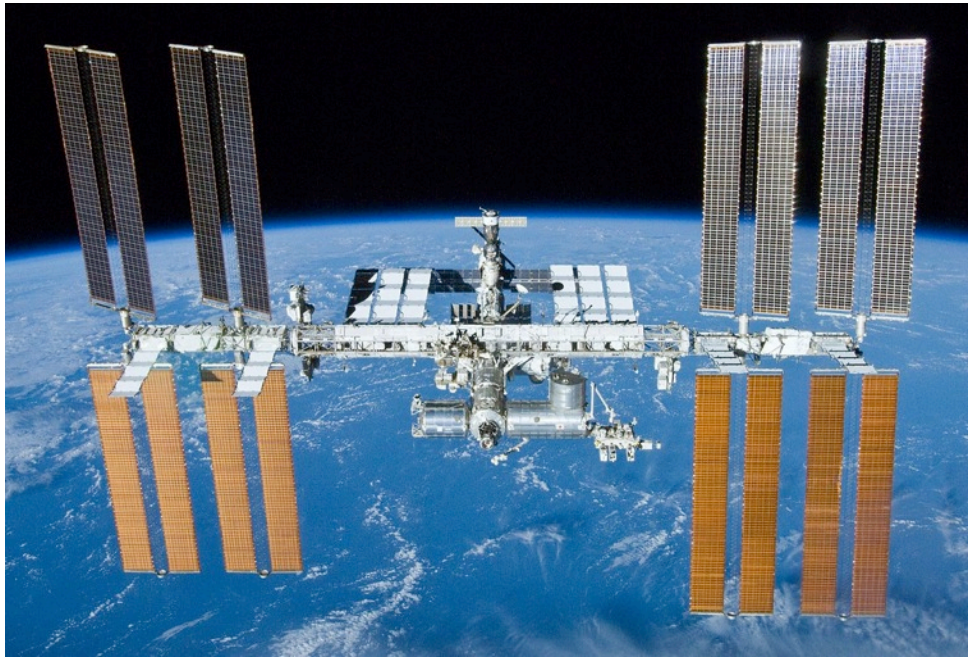
(SQUARE)

Collaborations (in progress)

Collaborations already established for experimental activities of magnetic characterization at LNF within the PRESS-MAG-O/MUEXC framework:

a) Roma Sapienza
b) Roma Tre (PRIN2008)
c) Hefei University
d) ICMA Zaragoza (INFN-CyCIT)

New 2015 experiment concept under discussion: IR_DET



Participants:

Alessandro Drago (60%)

Mariangela Cestelli Guidi (20%)

Emanuele Pace (20%)

Augusto Marcelli (?%)

SCF_Lab (30%, names TBD)

Time schedule: 2015-2016

Brief description of the experiment

The IR_DET proposal wants to extend the know-how acquired by the 3+L and 3L_2D CSNV funded experiments by developing time resolved infrared uncooled beam detectors to use it for the International Space Station laser time-of-flight to/from ground stations as well as to upgrade research and technology for bunch-by-bunch detectors in circular accelerator beam diagnostics.

A preliminary collaboration with the Matera Laser Ranging Observatory, (Agenzia Spaziale Italiana) is under consideration.

Below paper by Univ. Padova now joining MoonLIGHT-2 of CSN2

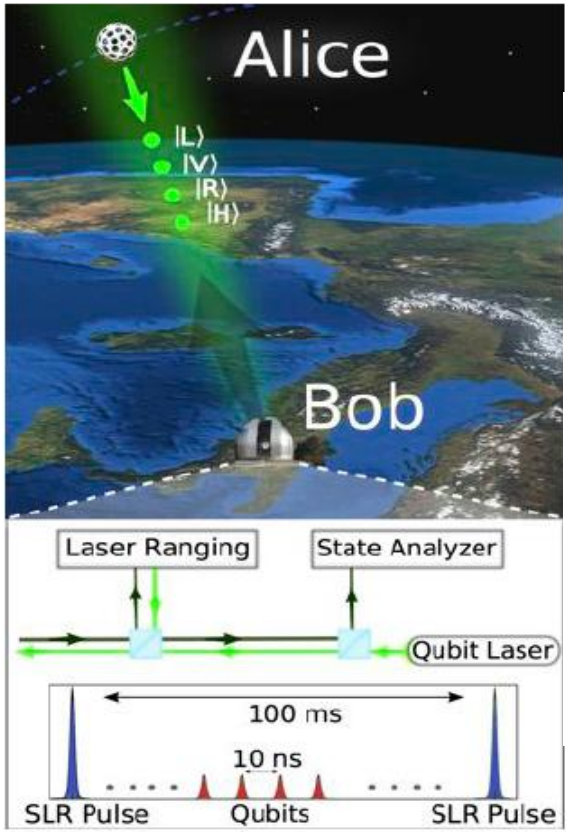


FIG. 1. Scheme of the Satellite QKD demonstration. Qubit pulses are sent at 100 Mhz repetition rate and are reflected back at the single photon level from the satellite, thus mimicking a QKD source on Space. Synchronization is performed by using the bright SLR pulses at repetition rate of 10 Hz.

Experimental Satellite Quantum Communications

Giuseppe Vallone,[1] Davide Bacco,[1] Daniele Dequal,[1] Simone Gaiarin,[1] Vincenza Luceri,[2] Giuseppe Bianco,[3] and Paolo Villoresi[1,*]

[1]*Dipartimento di Ingegneria dell'Informazione, Università degli Studi di Padova, Padova, Italy*
[2]*e-GEOS spa, Matera, Italy*
[3]*Matera Laser Ranging Observatory, Agenzia Spaziale Italiana, Matera, Italy*

Quantum Communications on planetary scale require complementary channels including ground and satellite links. The former have progressed up to commercial stage using fiber-cables, while for satellite links, the absence of terminals in orbit has impaired theirs development. However, the demonstration of the feasibility of such links is crucial for designing space payloads and to eventually enable the realization of protocols such as quantum-key-distribution (QKD) and quantum teleportation along satellite-to-ground or intersatellite links. We demonstrated the faithful transmission of qubits from space to ground by exploiting satellite corner cube retroreflectors acting as transmitter in orbit, obtaining a low error rate suitable for QKD. We also propose a two-way QKD protocol exploiting modulated retroreflectors that necessitates a minimal payload on satellite, thus facilitating the expansion of Space Quantum Communications.

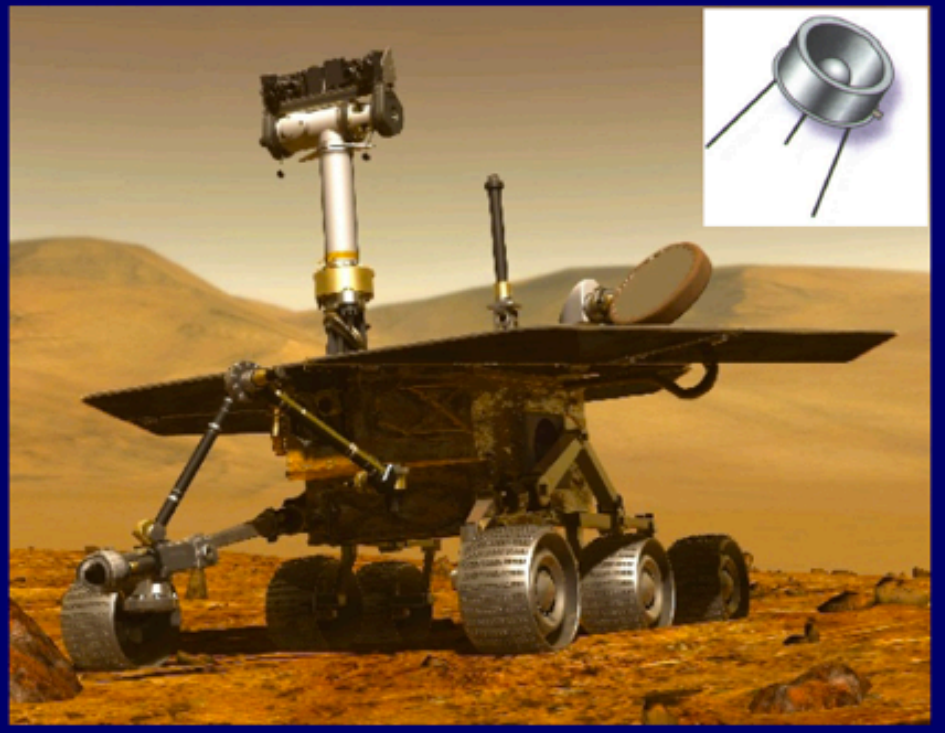
3L-2D IR detectors by VIGO have space inheritance

Press release

uncooled MCT infrared detectors developed at VIGO System have been chosen for use in a tunable laser spectrometer instrument designed to acquire information about the Martian environment during the Mars Science Laboratory mission

INFN Istituto Nazionale di Fisica Nucleare

SPACE APPLICATIONS of VIGO DEVICES



2011 NASA Mars Science Laboratory Mission

- uncooled PVI-4 and PVI-8.2 for extreme requirements
- remote chemical analysis in search of life traces

VIGO SYSTEM S.A.

NEURAPID 2014-2016

NEUtron RAPId Diagnostics

INFN-LNF

R. Bedogni	**0.6 FTE, Resp. Naz.le e LNF**
J.M. Gomez-Ros	**0.6**
A. Esposito	**0.1**
B. Buonomo	**0.2**
D. Sacco	**0.3**
A. Gentile	**0.4 *(CTER)***

INFN-Mi (Politecnico) **~ 1.5 FTE**

3.3 FTE complessivo + 0.4 CTER

Website *csn5neurapid*

Ambiti e obiettivi

L'obiettivo principale è la spettrometria/dosimetria meV-GeV dei campi di neutroni con dinamiche temporali "estreme", nei seguenti ambiti:

(1) Facilities con laser ultra-intensi e ultra-brevi (≈ fs)

I neutroni da interazione laser - target solido e da elettro- e foto-produzione a partire da target gassosi.

(2) Campi continui a bassissima intensità

Neutroni indotti dal campo cosmico al suolo ed alle quote di volo (campi continui con flussi ≈ 10^{-2} $cm^{-2}s^{-1}$)

Applicazioni a Terra e nello spazio

Richieste 2015

NEURAPID

Alla CSN V

- Sistema di mappatura attiva 3D della cavità di ETHERNES 8 k€
  - Assi lineari di precisione, motori e controller Labview-compatible, struttura di sostegno e aggancio a ETHERNES in materiale a bassa attivazione
  - Contatore a gas compensato per misura componente gamma in ETHERNES

- Large Area Thermal Neutron Detectors
  - 7 detectors x 3 strumenti, 1.2 k€ / detector, per equipaggiare gli spettrometri finali CYSP-Cosmic, CYSP-Pulse e SPEEDY 25 k€
  - Reagente per fabbricare i convertitori prompt per CYSP-Cosmic 4 k€
  - Dysprosio e Indio in purezza x radiatori delayed CYSP-Pulse e SPEEDY 3 k€
  - Resine e reagenti per stabilizzare i depositi sui rivelatori 0.5 k€

- Fabbricazione moderatori per CYSP-Cosmic, CYSP-Pulse e SPEEDY
  - HDPE polyethylene ad alta densità 3 k€
  - Piombo e plastico borato 4 k€
  - Lavorazione barra di HPDE da 500 (non fattibile ai LNF) 3 k€

- Missioni 3 k€
- Trasporto strumentazione 2 k€

Totale csnV 55.5 k€

Ai Servizi LNF SPCM

2 mesi-uomo officina meccanica

e-LiBaNS e-Linac Based Neutron Sources

Torino Resp. Nazionale M. Costa (~1.9 FTE)
Trieste Resp. Loc. G. Giannini (~1FTE)
LNF Resp. Loc. R. Bedogni (0.3 FTE), J.M. Gomez (0.3 FTE), D. Sacco (0.3 FTE)

Premessa: Il Dipartimento di Fisica Univ. di Torino mette a disposizione un bunker + sala controllo per ospitare un Elekta Precise 18 MV (e-linac ospedaliero *usato* di proprietà INFN)

e-LiBaNS si propone di realizzare sorgenti di neutroni basate su e-linac ospedalieri con flussi di n > 10^7 cm^{-2} s^{-1}, per applicazioni bio-mediche, spaziali, beni culturali

A tal fine la collaborazione e-LiBaNS si propone di progettare, costruire e testare sperimentalmente nuovi complessi di **foto-convertitore-moderatore** in grado di trasformare un e-linac in una sorgente intensa di n **termici, epitermici e veloci**.

Task di e-LiBaNS-LNF

Uso sistematico di ETHERNES

1. Caratterizzare con qualità metrologica l' esistente moderatore PHONES
2. Testare le diagnostiche di n termici
3. Studio Monte Carlo e realizzazione di una "epithermal head" da montare su ETHERNES, realizzato con NEURAPID

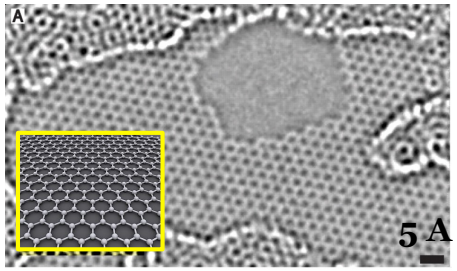
Richieste LNF x e-LiBaNS per l'anno 2015

Alla CSN V	**30 k€**
•Materiale per "epithermal head" (polyethylene, flex-boron, piombo)	14 k€
• Material per sonde n+γ (diodi da 1 cm2, scintillatore plastico, resine e reagenti)	6 k€
• Missioni	6 k€
• Trasporto strumentazione	4 k€

Ai LNF: 1 mese-uomo officina meccanica

GARFIELD: Graphene Active FIlms for Electronic Devices and Radiation Detection

- One of the three grants for young researchers funded by the CSN5 in the 2014/15
- Total Funding 150KEUR (75KEUR approved for 2014)
- Carried out at the LNF, within the research activities of the Material Science Lab at DAFNE-L
- Coordinated by Alessandra Di Gaspare



Graphene:

2D honeycomb array of C atoms
Gapless material (Dirac System)
High stability and mobility $\mu \sim 2*10^5\ cm^2/Vs$
Wide range of applications…

The GARFIELD Project (2014-15)

OBJECTIVES

1) Synthesis of graphene films via chemical vapor deposition (CVD) on Cu foils → Years 1-2
2) Development of graphene-based devices and detectors → Years 2

Research Unit @Laboratori Nazionali Frascati

Main Duties: Material growth, Spectroscopic analysis, Device testing

PEOPLE:

from LNF-INFN

Alessandra Di Gaspare (P.I.) 100% involved

Roberto Cimino 20%, Bencivenni 10% (0% if PIM call approved)

INFN Istituto Nazionale di Fisica Nucleare

3 research associates

Rosanna Larciprete 20% involved (Senior Scientist ISC-CNR)

Guglielmo Fortunato 100% (Senior Scientist IMM-CNR)

Andrea Notargiacomo 100% (Researcher IFN-CNR)

Consiglio Nazionale delle Ricerche

Research Activity & CSN5 Requests in 2015

(CVD System procurement and and installation in 2014)

- "In-house" development of novel techniques for the transfer of the graphene
- Study and quantitative assessment of the "as-grown" and "after-transfer" graphene films
- Development of G-based electronic devices usable as detectors, by means of standard microfabrication techniques
- Implementation of a set-up for the IV-characterization of devices and for the study of electronic transport in the graphene.

INSTRUMENTATION (55-60 KEUR)
CONSUMABLES (10-15 KEUR)
TRAVEL (5KEUR)

CSN5 Summary & News

- Total: 14 Experiments/Grant/Calls + BEAM4FUSION, 46.7 FTE, of which new proposals are
  - 2 Calls (PIM, SQUARE)
  - 3 Experiments: ARDESIA, E-LIBANS with Local Resp., IR_DET with Nat. Resp. (or as a new WP of ETRUSCO)
  - Assuming new proposals approved & Beam4Fusion closed

    5 on Accelerators (15.7 FTE)

    3 on Interdisciplinary Physics (17.6 FTE)

    6 on Detector/Electronics (14.0)
- CSN5 President elected Rector @ Univ. Sassari
  - New President election date TBD
- Next CSN5: LNS, 23-25/07/14, Ferrara, 29/09/14-03/10/14
- CSN5 Grants/Calls, 2nd year, under consolidation

CSN5 Resources Requested to LNF for 2015

Red: new activity	DT Service man-mo	DA Services man-month				DR Service man-mo
Experiment	SPCM	SELCED	VAC	MECC	CRY	SEA
SL-COMB		2	2	2		
SL-EXIN		2				
SL-FTERA		1	1			
ETRUSCO	7				2	5
NEURAPID	2					
E-LIBANS	1					
RDH	2					7.5
BEAM4FUSION?						
PIM (see talk)						
SQUARE (tbd)						
ARDESIA (see talk)						
IR_DET (tbd)						
Total	12	5	3	2	2	12.5

BEAM4FUSION: depends on PIM, info not received