



**UNIVERSITÀ
DEGLI STUDI
DI TRIESTE**



Spoke 2 - WP2 @ UniTS

Giuseppe Della Ricca (UniTS) - 22/09/22



Personale UniTS in WP2

- Andrea Bressan (PA, COMPASS/AMBER) - anche WP5
- Vieri Candelise (RTDa→b, CMS)
- Giuseppe Della Ricca (PO, CMS) - anche WP5
- Lorenzo Vitale (PA, BELLE II)
- Valentina Zaccolo (RTDb, ALICE)

WP3+WP4(+WP6):

- Edoardo Milotti (PA, VIRGO)
- Agata Trovato (RTDa→b, VIRGO)

Altro Personale in WP2

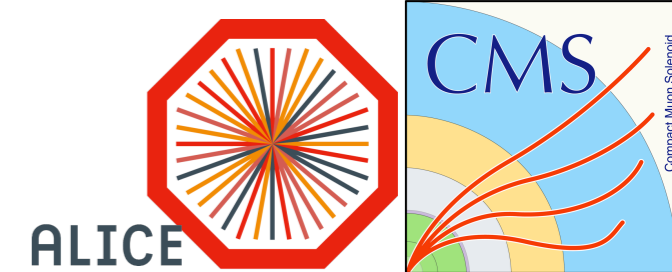
UniTS:

- un AdR in via di reclutamento su fondi INFN+UniTS su attività ALICE e CMS, compatibili con WP2 (contratto 2022/2023, rinnovabile 2023/2024 su PNRR)
- un PhD da reclutare su fondi PNRR - prossimo ciclo, inizio novembre 2023 (possibile cofin UniTS al 33-50%)
- un RTDa da reclutare su fondi PNRR discussione (cofin UniTS? cofin INFN?)

Alcune collaborazioni in corso con personale INFN:

- G. Luparello (ALICE, ML)
- S. Piano (ALICE, calcolo) - già in WP2 @ INFN
- F. Cossutti (CMS, MTD)

Proposta di attività in WP2



ML for 4D Vertexing @ HL-LHC

ALICE (Zaccolo+AdR+...) + CMS (Candelise+Della Ricca+AdR+...)

The inclusion of the timing information in the event reconstruction of present and future particle detectors in High Energy Physics is expected to provide great advantages in sensitivity for many precision physics measurements and searches for new particles, when facing very high rates of particle collisions at high luminosity accelerators. The integration of a timing detector in modern experiments is expected to have a huge impact on the heavy-flavour tagging of beauty and charm quarks. For Deep Neural Networks based tagging algorithms, the inclusion of timing information as input variable for the DNN can translate into a tagging efficiency gain of up to 4-6% at constant background rejection of light flavours of 1% from the spatial separation of spurious secondary vertices coming from out of time pile-up contamination of neutral particles in the event. Based on the physics case of interest, this gain can be even stronger when multi-jet final states are the dominant process, i.e. di-Higgs hadronic decays, search for long-lived particles and new resonances decaying hadronically. Timing information will also be relevant for studying multi-charm hadrons and exotic states in high-multiplicity and high-density conditions, such as those produced in heavy-ion collisions, and to separate charge deposits to search for new (anti-)nuclei, hyper-nuclei and super-nuclei.

Rilevanza/Applicazioni: ALICE TOF, CMS MTD

Competenze: generatori/simulazione/ricostruzione/monitoring/analisi/algoritmi/calcolo

Collaborazioni/Sinergie: Heavy Flavour Tagging with MVA in ATLAS @ UniCal ?
Analysis Tools and Interactive Analysis ?

PoliBA:
interesse/collaborazione
su aspetti di tracking
ad HL-LHC