

Summary of Italian group M&S activities

➤ CALET CAD model is implemented in Geant4 simulation.

All the shapes and size of the supporting structures have been extracted from Epics config. files and replicated in details in the Geant4 geometry description. Some simplifications have been introduced (e.g.: honeycomb) as we did with FLUKA.

(Lorenzo Pacini, Nicola Mori)

➤ Comparison of FLUKA, Epics and Geant4 simulations with benchmarks.

Normal incidence protons and electrons at 10, 100, 1000, 10000 GeV/n.

At the last, we showed the comparison of TASC response with FLUKA and Epics using the CAD model.

Now, the study of TASC, IMC and CHD responses using both CAD and Pisa geometry models will be shown.

(Lorenzo Pacini, Caterina Checchia)

Summary of Italian group M&S activities (2)

➤ e/p discrimination.

At the last TIM, we showed an analysis based on FLUKA simulated data.

Today, an e/p discrimination study based on Epics data will be shown.

- About 1.9×10^6 protons have been generated with Epics 9.165 in the energy range 1-100 TeV with E^{-1} spectrum, and within the CALET acceptance.
- Electron and proton efficiencies are estimated in the 900-1000 GeV energy bin with two different analyses based on consecutive selection cuts and Boosted Decision Trees (BDT), respectively.
- BDT allows to reach a $\sim 10\%$ higher electron efficiency with respect to the standard analysis (based on consecutive selection cuts) for the same proton rejection ($\sim 10^5$). This is in good agreement with results obtained with FLUKA data sample.
- This study is the topic of an ICRC paper.

(Francesco Palma)

Summary of Italian group M&S activities (3)

➤ Particle tracking and charge identification with IMC

- Further refinement of the algorithms for particle tracking based on a combinatorial Kalman filter.
- Development of algorithms seeking the first interaction point of nuclei, and identifying the particle charge by multiple dE/dx measurements in IMC.
- Study and evaluation of performance with FLUKA-simulated proton and helium data in the energy range 10 GeV-100 TeV.
- This study is the topic of an ICRC paper.

(Paolo Brogi)