

Invitation

to the seminar of Division of Elementary Particle Physics of the
Institute of Physics of the Czech Academy of Sciences



Tanguy Pierog
(Karlsruhe Institute of Technology)

EPOS LHC-R : a global approach to solve the muon puzzle

Abstract: The hadron production in the simulation of extensive air showers is a long standing problem and the origin of large uncertainties in the reconstruction of the mass of the high energy primary cosmic rays. Hadronic interaction models re-tuned after early LHC data give more consistent results among each other compared to the first generation of models, but still can't reproduce extended air shower data (EAS) consistently resulting in the so-called "muon puzzle". Using more recent LHC data like in the QGSJET-III model improve further the description of EAS by such a model but is not enough to resolve the discrepancy. On the other hand, the EPOS project is a theoretical global approach aiming at describing data from very fundamental electron-positron interactions to central heavy ions collisions. We will demonstrate that this approach can provide new constraints, changing the correlation between the measured data at mid-rapidity and the predicted particle production at large rapidities, which drive the EAS development. Thus, using the same accelerator data, different predictions are obtained in air shower simulations in much better agreement with the current air shower data (for both the maximum shower development depth X_{\max} and the energy spectrum of the muons at ground). Using the EPOS LHC-R model, the detailed changes will be addressed and their consequences on EAS observable at various energies.

When: Thursday, June 12, 2025 at 10AM

Where: Dvořák hall, FZU, Pod Vodárenskou věží 1, Prague

For more information, please see <https://indico.fzu.cz/event/303/>