The Hadronic Interaction Workshop

Report of Contributions

https://indico.ihep.ac.cn/e/25352

Contribution ID: **1** Type: **not specified**

Status and Prospects of the LHCf experiment

Wednesday, 19 March 2025 09:45 (45 minutes)

Precise knowledge of high energy hadronic interaction is an important key to understand air shower development. The LHCf experiment measures neutral particles such as photons, neutral pions, and neutrons, produced in the very forward region of LHC collisions, which contribute to the air shower development. Since the LHC start, LHCf performed many operations with pp collisions at several collision energies from 0.9 to 13.6 TeV and pPb. In addition, we will have an operation with proton-oxygen collisions scheduled in this July.
In this talk, we will present the results and prospects from the obtained data the as well as for proton-oxygen collision data.

Primary authors: MENJO, Hiroaki (Nagoya University); LHCF COLLABORATION

Presenter: MENJO, Hiroaki (Nagoya University)

Contribution ID: **2** Type: **not specified**

Model testing with DAMPE data

Presenter: XIANG LI

Contribution ID: **3** Type: **not specified**

Hadrons from a Multi-Phase Transport Model

Wednesday, 19 March 2025 16:45 (45 minutes)

The goal of a multi-phase transport (AMPT) model is to provide a kinetic theory description of all essential stages of relativistic nuclear collisions. Here I will first introduce the AMPT model including its structure and selected earlier results. I will then discuss the recent puzzle on baryon stopping from RHIC, which affects the yield and rapidity distributions of net-baryons. Finally, I will show new results of p+O collisions from AMPT at energies relevant to LHAASO, including the rapidity distributions of various hadrons and the effect of baryon stopping modeling on protons at large rapidities.

Primary author: LIN, Zi-Wei (East Carolina University)

Presenter: LIN, Zi-Wei (East Carolina University)

Contribution ID: **4** Type: **not specified**

Investigation of hadronic interaction models through muon content analysis in EAS with the LHAASO-KM2A

Thursday, 20 March 2025 11:00 (15 minutes)

This study investigates hadronic interaction models through a detailed analysis of muon content in extensive air showers (EAS) using the LHAASO-KM2A detector. The primary objective is to evaluate the consistency of muon production predictions from three hadronic interaction models (EPOS-LHC, QGSJET-II-04, and SIBYLL 2.3d) and spectral models (Gaisser H3a, Horandel, GSF, and LHAASO spectrum) against experimental data. Data collected between August 2021 and December 2023 from the full LHAASO-KM2A array are analyzed, covering cosmic ray energies from 300 TeV to 30 PeV. Key measurements include the muon content, its lateral distribution, relative fluctuations, and attenuation length. Comparisons between MC predictions and data highlight discrepancies in existing models, particularly in their treatment of muon production at ultra-high energies. These findings underscore the necessity of refining hadronic interaction models to better align with experimental observations, thereby enhancing the accuracy of cosmic ray composition studies and EAS simulations. This work contributes to resolving long-standing challenges in high-energy astrophysics, and validates LHAASO-KM2A ' s capabilities in advancing our understanding of cosmic ray interactions.

Primary author: FENG , Xiaoting (Shandong University)

Co-authors: FENG, Cunfeng (Shandong University); ZHANG, Hengying; MA, Lingling

Presenter: FENG , Xiaoting (Shandong University)

Contribution ID: **5** Type: **not specified**

Preliminary results of using LHAASO to test high-energy hadron interaction models

Thursday, 20 March 2025 11:15 (15 minutes)

The LHAASO experiment can measure muons and parameters related to the shower maximum in an extensive air shower. These parameters depend on the assumptions of the hadronic interaction model. This study uses parameters measured by LHAASO experiment to test hadronic interaction models. We will present the preliminary results of the testing of the EPOS-LHC and QGSJETII-04 models using the LHAASO experiment.

Primary author: 游智勇, Zhiyong You

Presenter: 游智勇, Zhiyong You

Contribution ID: **6** Type: **not specified**

Welcome

Wednesday, 19 March 2025 08:50 (10 minutes)

Contribution ID: **7** Type: **not specified**

EPOS: a comprehensive MC for high-energy collisions from pp, pA to AA

Wednesday, 19 March 2025 11:00 (45 minutes)

Presenter: KLAUS WERNER

Contribution ID: **8** Type: **not specified**

Forward Hadron Productions in proton-nucleus collisions at NLO

Wednesday, 19 March 2025 11:45 (45 minutes)

Presenter: BOWEN XIAO

Contribution ID: **9** Type: **not specified**

Forward particle production in pA collisions

Presenter: XIAOHUI LIU

Contribution ID: **10** Type: **not specified**

Parton Shower Algorithm Incorporating Saturation Effects

Wednesday, 19 March 2025 14:45 (45 minutes)

Presenter: JIAN ZHOU

Contribution ID: **11** Type: **not specified**

Model testing with DAMPE data

Presenter: QIANG LI

Contribution ID: **12** Type: **not specified**

HIJING: a MC model for particle and jet production in pp, pA and AA collisions

Wednesday, 19 March 2025 16:00 (45 minutes)

Presenter: WEI-TIAN DENG

Contribution ID: **13** Type: **not specified**

Dai-mei Zhou- A Brief Introduction to PACIAE 4.0

Thursday, 20 March 2025 09:00 (45 minutes)

Presenter: DAI-MEI ZHOU

Contribution ID: **14** Type: **not specified**

EPOS Updates

Thursday, 20 March 2025 09:45 (45 minutes)

Presenter: TANGUY PIEROG

Contribution ID: **15** Type: **not specified**

Free discussion

Thursday, 20 March 2025 14:00 (3 hours)

Contribution ID: **16** Type: **not specified**

Forward Particle Production in pA Collisions

Wednesday, 19 March 2025 14:00 (45 minutes)

I will emphasize the necessity of the soft mode in the small-x formalism for producing correctly the poles and for carrying out resummation.

Primary author: LIU, Xiaohui (Beijing Normal University)

Presenter: LIU, Xiaohui (Beijing Normal University)

Contribution ID: **17** Type: **not specified**

Concluding Remarks

Thursday, 20 March 2025 11:30 (30 minutes)

Contribution ID: **18** Type: **not specified**

Measurement of Hadronic Cross Sections for Proton and Nuclei in Space with the DAMPE Experiment

Wednesday, 19 March 2025 09:00 (45 minutes)

Presenter: YIFENG WEI 魏逸丰 (University of Science and Technology of China)