Contribution ID: **1105** Type: **Poster**

On the Origin of Ultra-high-energy Cosmic Rays Assuming a Heavy Mass Composition

Recent studies, supported by updated hadronic interaction models, suggest that the mass composition of ultra-high-energy cosmic rays may be heavier than previously assumed. This has significant implications for source identification, as the deflections of the Galactic magnetic field (GMF) are larger for heavy primaries than for lighter ones at the same energy. In this work, we assume that cosmic rays above 40 EeV consist of iron nuclei only and investigate their possible sources through simulations of cosmic ray propagation, including interactions with ambient photon fields and deflections in the GMF using UF23 models. We consider two types of sources as potential origins of these cosmic rays, active galactic nuclei (AGN) and starburst galaxies. We compare the predicted distributions of arrival directions from sources within 200 Mpc with the measured arrival directions of cosmic rays above 40 EeV. Our results indicate that stronger correlation is found for the AGN scenario compared to starburst galaxies. However, it is also shown that within our heavy mass composition model, the GMF leads to significant deflections, making source identification challenging with current knowledge and tools, even at the highest energies.

Collaboration(s)

Authors: BAKALOVA, Alena (FZU - Institute of Physics of the Czech Academy of Sciences); Dr MÜLLER, Ana Laura (FZU - Institute of Physics of the Czech Academy of Sciences); Dr VICHA, Jakub (Institute of Physics of the Czech Academy of Sciences)

Presenter: BAKALOVA, Alena (FZU - Institute of Physics of the Czech Academy of Sciences)

Session Classification: PO-1

Track Classification: Cosmic-Ray Indirect