Contribution ID: **195** Type: **Talk**

Ultra-High-Energy Cosmic Rays from Radio Galaxies

Tuesday, 28 August 2018 18:10 (17 minutes)

Radio galaxies are intensively discussed as the sources of cosmic rays observed above about 3 EeV, called ultra-high energy cosmic rays (UHECRs).
The talk presents a first, systematic study that takes the individual characteristics of these sources into account, as well as the impact of the galactic magnetic field, as well as the extragalactic magnetic-field structures up to a distance of 120 Mpc.

It will be shown that the average contribution of radio galaxies taken over a very large volume cannot explain the observed features of UHECRs measured at Earth, but could provide an explanation of the CRs with energies of a few EeV. However, a very good agreement with the spectrum, composition, and arrival-direction distribution of UHECRs measured by the Pierre Auger Observatory (Auger) is obtained by the contribution from only a few ultra-luminous ones, in particular Cygnus A and Centaurus A. Cygnus A needs to provide a mostly light composition of nuclear species dominating up to about 60 EeV, whereas the nearest radio galaxy, Centaurus A, provides a heavy composition and starts to dominate above 60 EeV. Thus, this scenario most likely also predicts differences in UHECR spectrum and composition between the northern and southern hemispheres. In order to account for these differences we include the geometrical exposure effects of Auger and the Telescope Array Observatory, which even improves the aggreement to the their measurements.

Primary author: Dr EICHMANN, Björn (Ruhr-Universität Bochum, Theoretische Physik IV)

Presenter: Dr EICHMANN, Björn (Ruhr-Universität Bochum, Theoretische Physik IV)

Session Classification: Cosmic Rays

Track Classification: Cosmic Rays