

Reconstruction of sub-threshold events of cosmic-ray radio detectors using an autoencoder

P. Bezyazeev*, S. Golovachev, A. Mikhaylenko, D. Kostunin, I. Plokhikh,
D. Shipilov, V. Sotnikov, E. Sotnikova and P. Turishcheva
for the Tunka-Rex Collaboration

What is this contribution about?

We present the most recent results in application of autoencoder technique for the radio detection including reconstruction of sub-threshold events not accessible by standard methods.

Why is it relevant / interesting?

Radio measurements of cosmic-ray air-showers are complicated due to the high amplitude of the radio background originating from both anthropogenic and astrophysical sources. The sources imprinted with unique features can be distinguished with deep learning techniques.

What have we done?

We present the reconstruction of real data from air-shower radio detector using deep neural networks for the first time.

What is the result?

We show the possibility of decreasing the threshold of radio detector while conserving angular and energy resolution by combination of deep learning and classical radio-physics techniques.

*presenter, bpa@astroparticle.online