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Background suppression for volcano muography with machine learning

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A deep neural network for the Muography Observatory System was developed to distinguish high energy muons (> 3 GeV) from low energy ones. A Geant4 based Monte-Carlo simulation was written to provide teaching sample to the neural network. The simulation was validated by measurements taken at the Sakurajima volcano. In order to understand how the neural network works, a game theoretic approach was used to explain the output of our machine learning model. SHAP values made it possible to understand which input parameters are the most important for the network on a case by case basis. The performance of the machine learning algorithm was compared to the classical tracking solution.

Primary author: GALGÓCZI, Gábor

Co-authors: Dr VARGA, Dezső (Wigner RCP); Dr HAMAR, Gergő (Wigner RCP); Dr OLÁH, László (The University of Tokyo)

Presenter: GALGÓCZI, Gábor

Session Classification: Applications in Muon Tomography

Track Classification: Muography