Contribution ID: **498** Type: **Poster**

# Vertex and Energy Reconstruction in JUNO with Machine Learning Methods

*Wednesday, May 26, 2021 5:12 AM (18 minutes)*

Determination of neutrino mass ordering and precise measurement of oscillation parameters $\sin^2\theta_{12}$, $\Delta m^2_{21}$ and $\Delta m^2_{31}$ are the main goals of JUNO experiment. A rich physics program such as solar neutrinos, supernova neutrinos, geo-neutrinos, and atmosphere neutrinos is foreseen. The ability to accurately reconstruct events in JUNO is critical to the success of the experiment. In this talk, four machine learning methods applied to the vertex and the energy reconstruction will be presented, including Boosted Decision Trees (BDT), Deep Neural Networks (DNN), Convolution Neural Networks (CNN), and Graph Neural Network (GNN). We demonstrated that machine learning methods can provide the necessary level of accuracy required to achieve JUNO's physical goals: $\sigma_E = 3\%$ and $\sigma_{x,y,z} = 10$ cm at 1 MeV for energy and vertex, respectively.

## TIPP2020 abstract resubmission?

No, this is an entirely new submission.

## Funding information

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**Session Classification:** Posters: Neutrino Experiments

**Track Classification:** Experiments: Experiments: Neutrino