Single and Double Electron Event Classification Using Machine Learning for the MAJORANA DEMONSTRATOR

Signals generated by single and double electron events are found in the dataset of the MAJORANA DEMONSTRATOR (MJD). MJD is searching for a signal due to a double electron event, so we would like to be able to filter out single electron events that pollute our signal. We show that through the use of a 10 layer convolutional neural network (CNN) in PyTorch, we can identify single and double electron waveforms generated by MaGe. The best networks have an AUC of 0.822, meaning 82.2% of the time they are correctly ranking a double electron event differently than a single electron event.