Contribution ID: **867** Type: **Parallel Talk**

Dark rate reduction with machine learning techniques for the Hyper-Kamiokande experiment

Saturday, 9 July 2022 09:30 (15 minutes)

The next generation water-Cherenkov detector, Hyper-Kamiokande (Hyper-K), is currently under construction in Japan and it is expected to be ready for data taking in 2027. Thanks to its huge fiducial volume and high statistics, Hyper-K will contribute to many investigations such as CP-violation, determination of neutrino mass ordering and potential observations of neutrinos from astrophysical sources. To increase the sensitivity of the detector, Hyper-K will have a hybrid configuration of photodetectors: thousands of 20-inch photomultipliers tubes (PMTs) will be combined with modules containing smaller PMTs arranged inside a pressure vessel, called multi-PMT modules. Many efforts are on-going to reduce the expected dark counts for a detector geometry which includes both photodetector modules. We report the details and the present performances of multivariate analysis techniques, such as Boosted Decision Tree, that are currently being applied to simulated events to reduce the overall dark rates of the detector, which is significantly important for Hyper-K's sensitivity to low energy neutrinos.

In-person participation

Yes

Primary authors: LANGELLA, Aurora (Istituto Nazionale di Fisica Nucleare); SPISSO, Bernardino (Istituto Nazionale di Fisica Nucleare); NASCIMENTO MACHADO, Lucas (Istituto Nazionale di Fisica Nucleare)

Presenter: LANGELLA, Aurora (Istituto Nazionale di Fisica Nucleare)

Session Classification: Neutrino Physics

Track Classification: Neutrino Physics