



Contribution ID: 130

Type: Poster

## NOvA Detector Validation and Aging Studies

Thursday 15 December 2022 14:00 (1 hour)

NOvA is a long baseline neutrino oscillation experiment based at Fermilab, with the primary aim of studying the properties of neutrinos, the most elusive type of fundamental particle. The experiment measures neutrinos from Fermilab's NuMI beam using two detectors: a near detector located 1 km downstream from the beam source, and a far detector at a baseline of 810 km. Both detectors utilize liquid scintillator technology and are functionally identical, which allows for significant cancellation of detector systematic uncertainties.

We have developed a toolset that comprises two parts one validation package which deals with the analysis codes producing low-level distributions directly from the event record at all stages of MC dataset production, from physics simulation through detector simulation and reconstruction, and the other dealing with the detector aging. On one hand, the validation package will help to keep track of all the changes going throughout the simulation and reconstruction phase and is an easy-to-use toolkit. On the other hand, since NOvA data-taking began in 2014, which places the experiment currently approximately halfway to the projected end of its lifetime. For such a long-lived experiment as NOvA, detector aging will have significant effects on the physics analysis. In general, this toolset helps us to track changes in both detectors and at the same time will also help to incorporate the aging effects at the simulation level. Tools developed for monitoring the detector performance and for the validation of the produced dataset will be presented.

### Session

Neutrino Physics

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**Session Classification:** Poster - 3