Contribution ID: **39** Type: **Contributed Oral**

Creating accurate optical module models in IceTray for the Pacific Ocean Neutrino Experiment

Friday, 13 February 2026 11:15 (15 minutes)

The detection of high-energy cosmic neutrinos by the IceCube and KM3NeT collaborations has raised questions of what astrophysical processes are creating these particles. In order to answer this question, additional large volume neutrino detectors must be constructed to offer full sky sensitivity to neutrino flux. The Pacific Ocean Neutrino Experiment (P-ONE) is a future underwater neutrino observatory located off the coast of Vancouver Island. With the first detectors expected to be in place next year, the simulation and analysis pipeline is being finalized. The Monte Carlo (MC) simulations and analysis for P-ONE are done using the IceTray framework, initially created for the IceCube Observatory. This framework requires geometry files which need to accurately represent the physical detector. The optical modules (OMs) that contain photomultiplier tubes (PMTs) are a pair of hemispheres mounted on either side of a titanium ring. The previous OM models used for the MC simulations were a single sphere with minimal detector information. Different shapes and configurations of OM models available within IceTray were created and tested, with the final design closely resembling the physical detectors. The updated model contains correct PMT orientations, along with accurate separation between the two hemispheres. This also allows for the visualization of events to show the directionality of the detected photons. While further tests and optimization of this model are needed as lab measurements from collaborators are collected, this model provides a significantly more accurate detector geometry for our simulations.

Your current academic level

MSc student

Your email address

bennettwinnickylewis@uvic.ca

Affiliation

University of Victoria

Supervisor email

hrussell@uvic.ca

Supervisor name

Heather Russell and Caleb Miller

Primary author: WINNICKY-LEWIS, Bennett (University of Victoria)

Presenter: WINNICKY-LEWIS, Bennett (University of Victoria)

Session Classification: Neutrino Physics

Track Classification: Neutrino properties