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Exploring the Universe from Deep Below the Waves: The Pacific Ocean Neutrino Experiment

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The Pacific Ocean Neutrino Experiment (P-ONE) is a planned multi-cubic-kilometer neutrino telescope in the Northeast Pacific Ocean off Vancouver Island, British Columbia. Its primary goal is to detect high-energy neutrinos, offering key insights into cosmic ray origins and acceleration mechanisms. Building on two successful pathfinder missions, the collaboration, in partnership with Ocean Networks Canada (ONC), is preparing to deploy its first detector line, P-ONE-1. This initial deployment will consist of 20 optical and calibration modules integrated into a novel hybrid cable architecture spanning over 1000 meters, connected to ONC's NEPTUNE deep-sea observatory. The extreme ocean environment, dynamic conditions, and background noise from bioluminescence and K-40 decay present unique challenges, requiring innovative design solutions while ensuring modularity and scalability. This talk will present an overview of P-ONE and highlight ongoing development and simulation efforts for P-ONE-1.

Keyword-1

Neutrino telescope

Keyword-2

Cosmic messenger

Keyword-3

Pacific ocean

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