

## The Angra Neutrinos Experiment and Its Contribution to IAEA Nonproliferation Safeguards

*Tuesday 8 April 2025 10:00 (30 minutes)*

The Angra Neutrinos Experiment utilizes a water Cherenkov detector operating at the Angra dos Reis nuclear facility in Brazil. Its primary purpose is to detect electron antineutrinos emitted by the nuclear reactor, aiming to demonstrate the feasibility of using such a detector to monitor reactor activity. This objective aligns with the International Atomic Energy Agency (IAEA) program dedicated to identifying novel technologies and broadening the range of possibilities applicable to nonproliferation safeguards.

Operating the experiment at surface level increases noise, which requires highly sensitive detectors. These conditions make the Angra experiment a valuable platform for testing experimental approaches and refining analysis techniques in a realistic operating environment. The detector incorporates a water-based target doped with gadolinium to enhance its sensitivity to antineutrino detection.

In this presentation, the principal components of the detector and its electronic systems are described, with emphasis on the custom front-end and data acquisition modules. The data acquisition strategies are discussed, along with the methodologies employed for signal processing and event selection. Using the ON-OFF analysis, an excess was observed in the positron energy spectrum of the inverse beta decay candidates, demonstrating that, even when operating at the surface, a robust water Cherenkov detector can be effectively used to monitor the reactor state.

**Author:** KEMP, Ernesto (Universidade Estadual de Campinas)

**Presenter:** KEMP, Ernesto (Universidade Estadual de Campinas)

**Session Classification:** Reactor antineutrino experiments III