

## WATCHMAN: Neutrino Physics and Non-Proliferation

WATCHMAN (Water Cherenkov Monitor of AntiNeutrinos) is an international collaboration whose purpose is to demonstrate the feasibility of using a gadolinium-doped water Cherenkov detector to detect electron anti-neutrinos emitted by distant nuclear reactors. Nuclear reactors produce high fluxes of anti-neutrinos during operation and have been exploited by many experiments during the entire epoch of experimental neutrino physics. Given the high fluxes, WATCHMAN aims to demonstrate a method to determine the existence or non-existence of hidden reactors at distances of hundreds of kilometers away from a detector location. The key game-changing ingredient is gadolinium-loaded water as the detection medium which enables neutron detection and thus detection of the delayed coincidence signal induced by electron anti-neutrino interactions with free protons. This technology can feasibly be scaled to megatons of mass - making detection of low-power reactors at long distances possible. WATCHMAN employs a kiloton-scale detector in the Boulby Mine in the United Kingdom to measure anti-neutrinos from the Hartlepool reactor complex. The current status of the project will be discussed.

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