

# Scalability of Gd-doped water-Cherenkov reactor-antineutrino IBD detectors for non-proliferation

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Recent advances in large water-Cherenkov detector technology, such as doping water with gadolinium at Super-Kamiokande, highlight the feasibility of detecting antineutrinos from power reactors hundreds of kilometers away.

However, in the context of nuclear non-proliferation, detecting power reactors is generally not considered a challenge using more traditional detection techniques. Of more interest are relatively small (50MWt) nuclear reactors which can potentially evade detection.

The question is then: with an accurate understanding of detector efficiencies and backgrounds, how scalable is the Gd-doped water-Cherenkov detection technique?

If we have a multi-kiloton detector, what is the maximum range to detect such a modest reactor in one year? Here we report on a recent study of the scalability of Gd-doped water Cherenkov detectors in three different reactor antineutrino background environments chosen to represent regions with high, medium and low concentrations of nearby large reactors.

## **Abstract title**

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