

Neutrino Science and Applications

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Abstract

50 years of fundamental antineutrino detection experiments at nuclear reactors have laid the groundwork for a new discipline - Applied Antineutrino Physics. Using well known detection methods, we and others worldwide have shown that antineutrino detectors can be used to monitor the operational status, power, and fissile content of reactors, non-intrusively and in real time. These capabilities are potentially relevant for global nonproliferation and nuclear materials control regimes. In the past few years, we have begun to explore several approaches to improving antineutrino detection. If successful, these could reduce detector footprints by a factor of ten, permit above-ground detection of reactor antineutrinos, or increase the standoff detection capability for small reactors out to hundreds of kilometers. I will describe our current and proposed activities in these areas of research, and point to the many connections of this work to ongoing efforts in fundamental neutrino science and particle astrophysics.