

Columbia University Physics Department Colloquium

Monday, April 23rd, 2012, 4:10 PM 428 Pupin Hall

Neutrino Science and Applications

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, our Lawrence Livermore and Sandia National Laboratories collaboration has successfully demonstrated the utility of antineutrino detectors for cooperative monitoring of the operational status, power, and fissile content of reactors, non-

intrusively and in real time. These capabilities are relevant for global nonproliferation and nuclear materials control regimes, especially IAEA reactor safeguards. In the past few years, we have begun to explore new methods of antineutrino detection, which may allow the detector footprint to shrink by a factor of ten, or, in the longer term, increase the standoff detection capability for small reactors out to hundreds of kilometers. I will describe our current and proposed activities in these regards, and point to the many connections of this work to fundamental neutrino science and particle astrophysics.

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