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Title: Neutrinos for nuclear security

Abstract:

Nuclear reactors are the brightest man-made neutrino sources and have been the workhorse of neutrino physics since the discovery of the neutrino. In the 1970s physicists realized that neutrinos also can be used to learn about the internal state of a nuclear reactor. The past decade has seen a significant increase in the interest in reactor neutrinos, thanks to the theta-13 experiments and the search for sterile neutrinos. In particular, I will discuss case studies we have performed for the historical case of the 1990s nuclear crisis in the Democratic People's Republic of Korea and for the IR-40 reactor in Iran. I will report on on-going efforts to develop suitable detectors for surface deployment close to a nuclear reactor and comment on the role coherent elastic neutrino nucleus scattering may play. With the most recent results from PROSPECT and other experiments, for the first time, a real world capability exists. I will also comment on coherent elastic neutrino nucleus scattering in this context.