

Next Generation Neutron Detection for Next Generation Nuclear Reactors

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As the demand for nuclear energy increases worldwide, and MO reactors come online, so does the availability of spent fuel that may be used as a medium of terror. That is, fuel for and waste or byproducts from fissile material refining and nuclear reactors (e.g. plutonium) pose a serious threat with respect to radiological dispersal and nuclear bomb detonation. Radiological dispersal can include fallout by means of water or atmospheric transport (e.g., dumping waste in a river) while fissile trafficking can include the transport of plutonium across a border by seaport entry. In order to safely increase the use of nuclear energy in Missouri, sensitive techniques for nuclear detection must be developed. Presently available commercial detectors are not sensitive enough to detect even large (~3kg) quantities of weapons grade plutonium that are hidden in a barrel of water; our borders are effectively open to critical mass sized plutonium transport. Profs. Caruso, Ching and Kruger (UMKC Physics) are developing detectors capable of a ten times increase in detection sensitivity over existing commercial detectors that will provide a critical component to the future Missouri nuclear safeguarding infrastructure.