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Detection of Breeding Blankets Using Antineutrinos BERNADETTE COGSWELL, Princeton University, PATRICK HUBER, Virginia Tech — The Plutonium Management and Disposition Agreement between the United States and Russia makes arrangements for the disposal of 34 metric tons of excess weapon-grade plutonium. Under this agreement Russia plans to dispose of its excess stocks by processing the plutonium into fuel for fast breeder reactors. To meet the disposition requirements this fuel would be burned while the fast reactors are run as burners, i.e., without a natural uranium blanket that can be used to breed plutonium surrounding the core. This talk discusses the potential application of antineutrino monitoring to the verification of the presence or absence of a breeding blanket. It is found that a 36 kg antineutrino detector, exploiting coherent elastic neutrino-nucleus scattering and made of silicon, could determine the presence of a breeding blanket at a liquid sodium cooled fast reactor at the 95% confidence level within 90 days. Such a detector would be a novel non-intrusive verification tool and could present a first application of coherent elastic neutrino-nucleus scattering to a real-world challenge.

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