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Neutron-neutron angular correlations in spontaneous and neutron-induced fission[1] RAMONA VOGT, Lawrence Livermore Natl Lab, JORGEN RANDRUP, Lawrence Berkeley National Lab — For many years, the state of the art for treating fission in radiation transport codes has involved sampling from average distributions. However, such average fission models have limited interaction-by-interaction capabilities. Energy is not explicitly conserved and no correlations are available because all particles are emitted isotropically and independently. However, in a true fission event, the energies, momenta and multiplicities of emitted particles are correlated. Such correlations are interesting for many modern applications, including detecting small amounts of material and detector development. Event-by-event generation of complete fission events are particularly useful because it is possible to obtain the fission products as well as the prompt neutrons and photons emitted during the fission process, all with complete kinematic information. It is therefore possible to extract any desired correlation observables. Such codes, when included in broader Monte Carlo transport codes, like MCNP, can be made broadly available. We compare results from our fast event-by-event fission code FREYA (Fission Reaction Event Yield Algorithm) with available neutron-neutron angular correlation data and study the sensitivities of these observables to the model inputs.

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