

Physics Division Seminar

Ramona Vogt

Lawrence Livermore National Laboratory

Modeling of Fission and its Impact on the r Process

Host: Ian Cloët

Monday, March 16, 2020 – 203, R150, 3:30 PM

For many years, the state of the art for treating fission in transport models involved sampling from average distributions. In these average fission models, energy is not explicitly conserved and none of the emissions are correlated because all particles are emitted independently. However, in a true fission event, the energies, momenta and multiplicities of the emitted particles are correlated. Such correlations are interesting for many modern applications. Event-by-event generation of complete fission events makes it possible to retain the kinematic information for all particles emitted: the fission products as well as prompt neutrons and photons. It is therefore possible to extract any desired correlation observable. The types of available data for model input and validation are presented. The physics of one such complete event fission simulation code, FREYA, is described and some typical results are presented, along with comparison to data. A recent usage of FREYA for fission recycling in the r process is briefly described.