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Neural Network-Based Prediction of Particle-Induced Fission Cross Sections for r-Process Nucleosynthesis Trained with Experimental Data and Dynamical Reaction Models

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Large-scale computations of fission properties play a crucial role in nuclear reaction network calculations simulating rapid neutron-capture process (r-process) nucleosynthesis. Due to the large number of fissioning nuclei contributing to the r-process, a description of particle-induced fission reactions is computationally challenging. In this contribution, we will use the experimental data on proton- and neutron-induced fission reactions, along with theoretical calculations based on the INCL+ABLA model, to train neural networks (NN). We will present the results for the prediction of proton- and neutron-induced fission cross sections, utilizing a large variety of NN models across the hyper-parameter space, that are relevant for the r-process nucleosynthesis.

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