

LISE quick safety setting simulation using & ML Machine learning assisted Super-FRS operation

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LISE quick safety setting simulation using ML

The LISE tool from MSU is widely used to prepare settings for nuclear physics spectrometers around the world. LISE is a very versatile and potent tool including all nuclear physics models needed for precise calculation. The main drawback is a standard setting calculation for a Super-FRS setting, used to check the total particle rate at each focal plane would take up to 2 hours. This is fine for preparing experiments, but a bit problematic to use as a “check is the setting is safe” for an operator. Ways to increase the speed of the simulation are investigated.

Machine learning assisted Super-FRS operation

The Super-FRS is built on the same principle than the FRS, but the number of detectors, focal plane and magnets is increased by 6 to 10 folds. This means the standard operation, to be performed in a reasonable time, will require more computer assistance than the FRS operation. There are two solutions to this problem, the first one is to rely more on predictive setting, which would be included in the machine model using LSA, the second is to support the operator in automatizing/guiding some of the task. In this paper we explore few ideas where Machine Learning would support Super-FRS operation in commissioning and standard operation phase. The requirement (interface) to permit such work will be presented.

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