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## Plans for Performance and Model Improvements in the LISE++ Software Suite

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LISE++ is the standard software used at in-flight separator facilities for predicting beam intensity and purity. LISE++ simulates nuclear physics experiments where fragments are produced then selected with a spectrometer. The use of LISE++ in most facilities is to predict and identify the composition of Radioactive Nuclear Beams [1]. Intensity and purity of a desired beam can be predicted, along with the separator magnet settings. The LISE++ package allows simulation of isotope production, separation, ion optical transport through magnetic and electric systems, and ion interactions in matter. The suite includes utilities for simulation of experiments. A set of modifications are planned to improve the functionality of the code.

The modifications include a transportation to a modern graphics framework and updated compilers to aid in the performance and sustainability of the code. To accommodate the diversity of our users, we extend the software from Windows to a cross platform application. The calculations of beam transport and isotope production are becoming more computationally intense with the new large scale facilities. For example, the FRIB separator will have around fifty magnetic elements and ten points of beam interactions with matter. In order to perform the calculations in acceptable time, code optimization and parallel methods are applied. Planned new features include new types of optimization, for example, optimization of ion optics, improvements in reaction models, and new event generator options. In addition, LISE++ interface with control systems are planned. Computational improvements as well as the schedule for updating this large package will be discussed.

[1] O.B.Tarasov and D.Bazin, Nuclear Instruments and Methods in Phys.Research B 266 (2008) 4657–4664

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