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$LISE_{cute}^{++}$, the latest generation of the $LISE^{++}$ package, to simulate rare isotope production with fragment-separators

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The $LISE^{++}$ software for fragment separator simulations has undergone a major update. The package, widely used at rare isotope beam facilities, can be used to predict intensities and purities of rare isotope beams and for planning and running of experiments using in-flight separators. It is especially useful for radioactive beam production as its results can be quickly compared to on-line data. The $LISE^{++}$ package has been ported to the Qt-framework in order to support modern compilers and computing methods. The benefits include 64-bit operation and $LISE^{++}$ availability on three different platforms: Windows, macOS and Linux. In addition, the porting provides the ability to take advantage of future computational improvements. The updated package is named $LISE_{cute}^{++}$ to indicate a major step forward from the previous Borland-based versions. The $LISE_{cute}^{++}$ package remains essentially identical for all platforms, keeping all previous versions functionality with implementation of new features and utilities. In addition to porting to the new platform, new features and modifications been added, such as 3-D Monte Carlo plotting including 3-D envelopes. The codes ETACHA4 and GEMINI++ were ported to a GUI and implemented in the package. In context of production models, new utilities have been developed such as a minimization procedure using the Abrasion-Ablation model to adjust its parameters based on experimental projectile-fragmentation cross-sections and an initial fissile nuclei analyzer.

The next steps in the $LISE_{cute}^{++}$ package development will be discussed in this presentation. These include the creation of a $LISE_{core}^{++}$ library that will allow integration of $LISE^{++}$ calculations within control systems. This will directly assist in the tuning of fragment separators. Code parallelization will allow use of modern computing architecture and are essential to achieve faster computation.

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