# Compiled Python module development for IMPACT interface

We are planning to use IMPACT-Z for FRIB (Facility for Rare Isotope Beams) and developing it as FRIB-branch. In FRIB, IMPACT is used as the precise simulation tool which dedicate to simulate particle losses, nonlinear and space-charge effect for both offline and online analysis. Original IMPACT provides executable file only, therefore the user needs to access the simulation results through the file in disk and load input files including large 3D field data every time like in the case of parameter survey studies.

We have refactored IMPACT-Z to provide the compiled module for Python to support flexible inputs, direct output management, and iterative running in memory. It can be directly connected to the modern scientific tools typified by the parameter optimizers through the Python interface. In addition, the module can accomplish the interactive simulation process without losing computational efficiency because of the core part of the calculation is compiled by using general compiler. We report the code design of Python module of IMPACT and use cases in FRIB.

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