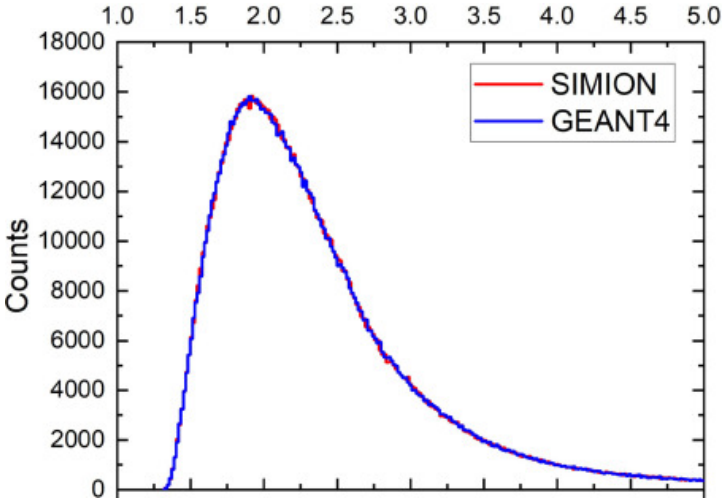
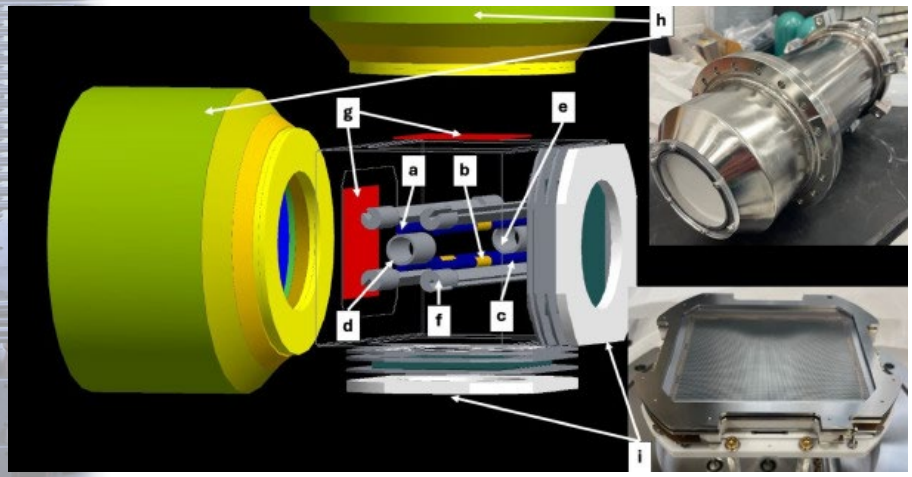
Novel simulation methods for dynamics and decay in the St. Benedict Paul trap

The Superallowed Transition Beta-Neutrino Decay Ion Coincidence Trap (St. Benedict) will perform precise measurements of nuclear beta decay transitions to test the unitarity of the quark-mixing matrix and probe physics Beyond the Standard Model. Such measurement requires a detailed understanding of the dynamics of trapped ions and their decays.





Simulations of the behavior of trapped mother ions and their associated decay daughter ions have been completed, and include unique, novel developments for calculating ion trajectories within Geant4 (and benchmarked with SIMION) that have wide-ranging applicability to a variety of ion optical systems.

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