

A method for reaction luminosity determination in a storage ring

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Reactions induced by charged-particles play an important role in the research of explosive scenarios in astrophysics. The energy range for the Gamow window of these reactions under astrophysical conditions is around only a few MeV or less. For such low-energy reaction cross-section measurements performed at a storage ring, background due to Rutherford scattering is typically an obstacle. However, the known distribution of this fundamental scattering process can be employed for *in situ* determination of reaction luminosity, which enters directly into the cross-section calculation and is a crucial parameter in the experiments.

We propose a method to simulate the realistic scattering distribution for a specific detector geometry. By comparing the simulation and experiment, the luminosity can accurately be extracted. This method provides a reliable way to measure the luminosity. It is especially useful if the luminosity determination through other methods is complicated or impossible.