

Nuclear astrophysics with European Recoil Separator ERNA

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Proton and alpha radiative capture reactions play an important role in nucleosynthesis and stellar evolution. Most of the existing data have been obtained in experiments based on gamma-ray detection. However, this approach is limited by various background sources that, together with the typically low cross sections, result in a rather poor signal-to-background ratio. A recoil mass separator represents a viable solution, in which the detection of residual nuclei with appropriate kinematic constraints allows for very effective suppression of the cosmic and ambient background, at the cost of a more complex setup and experimental procedures than are typical for gamma spectroscopy. A review of the field and, in this context, the ERNA (European Recoil mass separator for Nuclear Astrophysics) results for the ${}^7\text{Be}+p$ and ${}^{12}\text{C}+{}^4\text{He}$ reactions are presented.