

Searching for nuclei on the edge of stability with multi-step fragmentation

Authors: Xiu-Lin Wei, Bao-Hua Sun, Satoru Terashima, The provided input “Isao Tanihata” is not Simplified Chinese text and therefore cannot be translated under the specified requirements. Please provide the Chinese academic content to be translated., Tian-Yu Wu, Chang-Jian Wang, Bao-Hua Sun, Satoru Terashima

Date: 2025-06-30T16:41:09+00:00

Abstract

Exploring the limits of neutron binding in atomic nuclei remains a central focus of nuclear physics. However, the experimental determination of the neutron drip line is challenging because of the minuscule production cross sections of the most neutron-rich isotopes. We investigated the effectiveness of multi-step fragmentation for producing extremely neutron-rich nuclides at relativistic energies. We demonstrate that multi-step fragmentation dominates over single-step fragmentation in thick target experiments and can enhance the yields of drip line nuclei by several orders of magnitude in a realistic experiment using fragment separators. Such enhancements open new possibilities for locating drip lines above sodium, and thus significantly expand the research horizon.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv — Machine translation. Verify with original.