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RI-induced reaction studies by new energy-degrading beam line, OEDO

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The RI beam factory (RIBF) has expanded variety of accessible nuclei, and provides very intense RI beams. However, the beams are energy range of above 100 MeV/u, and are not necessarily suitable to some kinds of nuclear reactions. Therefore, deceleration of intense RI beams from RIBF open potentially new scientific opportunities to access various states in exotic nuclei by using characteristics probes, such as transfer reactions at several ten MeV/u and fusion reactions at several MeV/u. For energy degrading of nuclear beams, the degrader is generally used. This method easily controls beam energy, while multiple scattering effect and energy straggling in the material broaden the beam spot size at the downstream foci. Therefore, a key issue for reaction measurements is achievement of ion transport to reduce the beam emittance at the secondary target. For this purpose, CNS has set up OEDO (Optimized Energy Degrading Optics for RI beam) project for production of high-quality low energy RI beams. The OEDO beam line scheme is planned to be achieved by re-arrangement of magnets of the high-resolution beam line, where the SHARAQ spectrometer is useful as a spectrograph for low-energy reaction spectroscopy. In this presentation, I will discuss scientific opportunities in the OEDO beam line and the SHARAQ spectrometer.