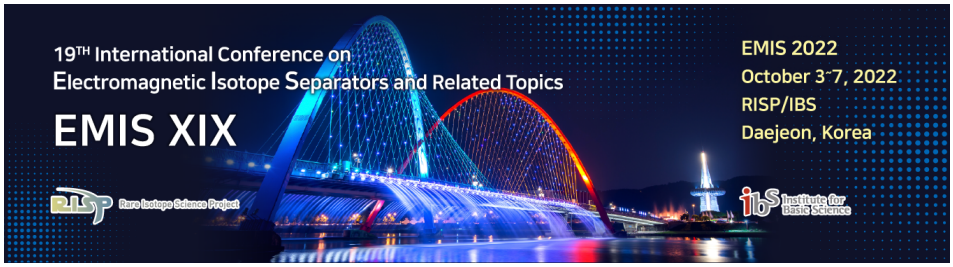

Contribution ID: **134** Type: **Invited**

Targets for In-Flight Separators with Intense Beams

Monday, 3 October 2022 11:10 (30 minutes)

Production of rare ions from projectiles in flight is a universal technique for most nuclides. Besides fragmentation and fission in-flight also fusion and multi-nucleon transfer can be used for production. A separator is needed before inflight identification of ions and experiments can follow.
With more intense beams the first challenge is the target itself, because heavy ion beams lead to a high density of energy deposition. Cooling mechanisms need to be integrated and radiation damage be considered. Mechanical stress is another limit which especially becomes sever as dynamic stress in case of pulsed beams. The basic parameters for optimisation of yields will be discussed, with respect to production cross sections, target thickness, energy-loss in the target as a limiting factor. The latest high intensity facilities BigRIPS/RIKEN, ARIS/FRIB, Super-FRS/FAIR, S3/GANIL, HFRS/HIAF, IF/RAON are good examples.
It is the direct integration into an isotope separator which causes most difficulties. The systems have to work in vacuum as with the intense beam vacuum windows are usually ruled out. The separator must be designed in such a way that intense beam must not hit a normal vacuum chamber but only dedicated beam catchers. As the expensive separator should be versatile for many nuclides, the remaining primary beam can hit many positions and due to a different magnetic rigidity will also be focused differently than the wanted fragment beam. All this has to be considered in the design of the separator. Contrary to dedicated beam dumps for production of only one particle species at one fixed energy the design becomes much more complicated. It will be shown in the case of Super-FRS.
It also means handling of the components hit by intense beams have limited lifetimes and require a bigger infrastructure for handling of radioactive parts around it, as will be shown in the case of Super-FRS.

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