Secondary-beam production – protons versus heavy-ions

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It is the purpose of future secondary-beam facilities to deliver beams of radioactive nuclei with the highest intensities and with the most wide-spread neutron-to-proton ratio possible for experiments which aim in improving our knowledge on nuclear properties far from the valley of beta stability, reaching towards the drip lines. Obviously, the estimation of the available secondary-beam intensities and in particular of the limitations in their neutron-to-proton ratio is of prime importance for the prospects of such a facility. At present, several different secondary-beam facilities are under realisation or planning (e.g. Big-RIPS, EURISOL, FAIR, MAFF, RIA, SPIRAL-2). Different methods for the production of secondary beams are considered: spallation reaction, projectile fragmentation, heavy-ion fusion, neutron-induced fission. Therefore, a good understanding of the nuclear reactions involved is of prime importance in order to estimate reachable intensities. In view of many different parameters to be varied, realistic nuclear models with high predictive power are required. These estimations, performed for different possible technical solutions, help to make decisions on the preferences given to the different technical options in the design phase. In present work we compare these different methods with the standard 1 GeV proton-beam option of the EURISOL driver accelerator. We discuss advantages and disadvantages of different technical solutions in a view of nuclear-reaction aspects and the technical limitations of the ISOL method.