**Systematics on cross sections from fragmentation and fission reactions**

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Three reaction mechanisms provide the most promising prospects for the production of secondary beams. Fusion is best suited for the production of nuclei near the proton drip line. Fission specifically populates mid-mass neutron-rich isotopes. Fragmentation and spallation reactions represent rather universal production mechanisms for both neutron-deficient and neutron-rich exotic nuclei, since the fluctuations in the N-over-Z ratio are very important. Due to these large fluctuations, this is the most promising reaction mechanism to reach extremely exotic nuclei over the whole mass range, if sufficiently high primary-beam intensities are available. In particular, it seems to be a unique process for the production of extremely neutron-rich isotopes of elements above the region of fission fragments.

Computer models for understanding reaction mechanisms and predicting the cross sections of fragmentation and fission processes have been developed in our group [e.g. 1,3]. A great amount of experimental data on the production of residual nuclei in reactions at relativistic energies has been obtained in several experiments recently performed at GSI in inverse kinematics [e.g. 2-7]. On the basis of these data, realistic parameters for model calculations can be deduced, and the model predictions can be verified.

The good actual knowledge of the characteristics of the nuclear reactions allows for choosing conditions optimised to specific needs for the secondary-beam production. Using our experimental data and models it is possible to give rather realistic estimates on the prospects for secondary-beam production in next-generation facilities.

## References

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