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Experiments and goals with present and future in-flight separators

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Modern methods of production and separation of exotic nuclear beams are presented. The research potential of in-flight separators is demonstrated with key experiments performed with separators and their combination with storage-cooler rings and ion traps. These combinations represent novel experimental developments with a large potential for research and applications. Although the present facilities have contributed much to the progress in the field of nuclear physics, major new fields will be open up by the next-generation facilities presently under construction or planned. The challenges in physics, instrumentation and technical developments will also be covered in this review talk including the present efforts in many institutes worldwide.