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The CARIBU gas catcher

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The CARIBU facility provides neutron-rich radioactive beams at low-energy or reaccelerated to energy up to 10-15 MeV/u for experiments addressing issues in nuclear physics, nuclear astrophysics and various applications. The source for these radioactive ions is a large high-intensity gas catcher used to thermalize neutron-rich recoils from the fission of a 1 Ci 252Cf source. This approach provides fast and essentially universal extraction of all fission fragments and delivers a low-emittance beam suitable for high-resolution mass separation and post-acceleration. The CARIBU gas catcher operates successfully under extreme conditions with intense neutron, alpha particle and fission recoil bombardment while extracting reliably a total of 107 to 108 short-lived radioactive ions per second. The technical developments that allow this performance level will be presented, together with a detailed characterization of the results obtained thus far, and a discussion of further improvements being implemented to reach total extracted radioactive beam intensities well above 108 ions per second.

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