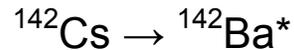


First β -Decay Study with CARIBU and Gammasphere:



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As part of the commissioning of the CARIBU facility at ATLAS, a beam of ^{142}Cs ions from CARIBU was charge bred and, subsequently, accelerated to ~ 6 MeV/A by the ATLAS superconducting linac before being transported to the target location of the Gammasphere spectrometer. For 16 hours, a beam of 10^3 ^{142}Cs ions/s was implanted in a Pb foil and γ radiation following β decay ($T_{1/2} = 1.68\text{s}$) was detected by the 101 Compton-suppressed germanium detectors of the Gammasphere array. The power of the CARIBU-Gammasphere combination for β -decay investigations was demonstrated.

The known ^{142}Ba level scheme was considerably expanded: 215 γ -ray transitions have been identified and placed into an expanded level scheme with 71 states. Furthermore, a large number of spin-parity assignments were made based on the measured angular correlations. High-precision $\log ft$ values were determined as well. The data provide important new information about the nature of low-spin excitations in this nucleus. In particular, new information is obtained about the strength of octupole correlations and the nature of other low-lying excitations.

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