

Measurement of proton spallation cross-sections of natCr and 55Mn between 0.2-2.5 GeV relevant to galactic cosmic ray propagation [10'+5']

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TIGERISS, the recently selected Pioneers mission, will look at elemental abundances across a wide Z range, from 5B up to 82Pb, for the first time with a single instrument, to further our knowledge of the way the galaxy redistributes elements. However, accurate cross section data is paramount to the accurate interpretation of this observed experimental data. High Z (>Z) proton spallation reaction channels and the sub-Fe region isotopes (which are crucial for constraining re-acceleration models) are lacking in cross-section data, especially at higher energies. To address this shortage, our team at NASA Goddard has established a collaboration with various institutes worldwide (Brookhaven National Laboratory, Facility for Rare Isotope Beams, NA61 at CERN) to perform a series of cross-section experiments for the reaction channels of utmost importance to the study of galactic cosmic ray propagation. The first of these experiments was performed in March 2024, at Brookhaven National Lab. Proton beams with energies between 0.2 to 2.5 GeV were irradiated upon a natural Cr and a monoisotopic Mn target, and the cross sections of several nat Cr(p,X) and Mn (p,X) reactions are currently being determined, using known gamma-ray lines of unstable daughter products. We will report upon the results of this experiment, and our future plans in this endeavour.

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