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Experimental study of the 60Fe destruction using the d(60Fe,pg)61Fe transfer reaction.

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Observations of 60Fe are crucial for several astrophysical studies: (i) characteristic gamma-ray lines of 60Fe decay are observed in our galaxy confirming nucleosynthesis processes are still active nowadays, (ii) detection of 60Fe in marine sediment has been interpreted as a close-by supernova explosion 2 million years ago and (iii) observation of 60Fe in presolar grains is used to constraint the astrophysical environment of solar system formation. However the interpretation of these observations rely on 60Fe yields, presently very uncertain, obtained from stellar models. One key ingredient in such models are the cross-sections of the production [59Fe(n,g)60Fe] and destruction [60Fe(n,g)61Fe] of 60Fe and current nuclear uncertainties on these reactions translate into a factor of 5 uncertainty in the 60Fe yield.

We report here on the study of the direct component of the 60Fe(n,g)61Fe reaction using the one neutron transfer reaction d(60Fe,pg)61Fe performed in LISE at GANIL. Protons were detected with the MUST2 array in coincidence with the gamma-rays detected in the EXOGAM array. Beam-like nuclei were identified with an ionization chamber and a plastic at zero degree. Excitation energy spectra will be presented as well as angular distributions for the known and new populated levels observed in 61Fe. Spectroscopic factors and transferred angular momentum will be presented as well as comparison with shell-model
calculations will be presented.

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