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Measurement of neutron capture cross section of ^{64}Ni at n_TOF

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Neutron capture cross sections of ^{64}Ni is an important parameter to accurately simulate the s-process and validate stellar models. As ^{64}Ni is among the seeds of the s-process, the uncertainty on its capture cross section has been shown to significantly affect the predicted abundances of many isotopes produced by the s-process both in massive and AGB stars. Moreover, the uncertain value of this cross section may be the cause of the discrepancy observed between predicted and measured ^{64}Ni isotopic ratios in SiC presolar grains. Indeed, the MACS reported by different releases of data libraries show discrepancies higher than a factor 2 at 5 keV. For these reasons, a new accurate time-of-flight measurement was carried out during summer 2023 at the n_TOF facility at CERN. The preliminary results confirm most of the resonances up to 100 keV, except for a huge resonance at 9.52 keV, reported in many of the most recent data library releases. As this resonance was expected to contribute more than 60% to the MACS at 5 keV, a significant reduction of the value reported in the most recent library releases is expected. Motivation, measurement and these preliminary results will be presented.

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