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Measurement of $^{63,65}\text{Cu}$ neutron capture cross sections at the n_TOF facility

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Neutron-induced reactions on Copper are of great relevance for both nuclear technologies and astrophysics. Copper is a key structural material in the TAPIRO research reactor, which plays a crucial role in validating nuclear data and materials for fast Generation IV reactors. Recent sensitivity and uncertainty studies on TAPIRO have highlighted the need for improved Copper cross section data due to inconsistencies in current evaluations. In stellar nucleosynthesis, Copper is an important iron-peak element, and its neutron capture cross section significantly influences s-process modeling in massive stars.

To address this need for improved Copper cross section data, the n_TOF collaboration is conducting a dedicated measurement campaign on $^{63,65}\text{Cu}(n,\gamma)$ and $^{63,65}\text{Cu}(n,\text{tot})$ cross sections. n_TOF is a high-resolution time-of-flight facility at CERN, covering a wide neutron energy range (meV - GeV) with a high flux and low duty cycle. Measurements are performed at EAR1, located 185 meters from the spallation target, offering optimal conditions for high-precision resonance parameter extraction. The combination of capture and transmission data allows the determination of the elastic cross section.

This contribution will present preliminary results from the ongoing analysis of the 2024 capture measurement campaign.

This presentation is given on behalf of the n_TOF Collaboration.

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