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Recent highlights and prospects on (n,γ) measurements at the CERN n_TOF facility

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Neutron capture cross-section measurements are fundamental in the study of astrophysical phenomena, such as the slow neutron capture (s -) process of nucleosynthesis operating in red-giant and massive stars. One of the best suited methods to measure neutron capture (n,γ) cross sections over the full stellar range of interest is the time-of-flight (TOF) technique.

TOF neutron capture measurements on key s -process branching isotopes are very challenging due to the limited mass (\sim mg) available and the high experimental background arising from the sample activity. Overcoming the current experimental limitations requires the combination of facilities with high instantaneous flux, such as n_TOF, with detection systems with an enhanced detection sensitivity and high counting rate capabilities.

This contribution will present an overview about the recent highlights in the field of (n,γ) measurements at n_TOF. The recent upgrades on the facility, such as the opening of the high-flux n_TOF-NEAR activation station, and the future prospects for new measurements involving unstable targets will be discussed.

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