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## Recent highlights and prospects on $(n, \gamma)$ 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  $(n,\gamma)$  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 (~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  $(n,\gamma)$  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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