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Measurement of neutron capture cross section of ^{30}Si at n_TOF

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Neutron capture cross sections of ^{30}Si are an important parameter to study the origin of silicon in our Solar System and understand isotopic abundances in SiC presolar grains. The bulk of ^{30}Si present in our Galaxy is produced in massive stars during carbon shell burning phases and its neutron capture cross sections strongly impact on its abundance. An accurate value of the neutron capture cross section of ^{30}Si is also needed to disentangle the contributions of the s-process nucleosynthesis to the silicon abundances measured in mainstream SiC grains in order to test stellar evolution models. Since available experimental data are scarce and discrepant (the two most recent measurements show a discrepancy in the stellar cross section of approximately a factor 2), a new accurate time-of-flight measurement was carried out during summer 2023 at the n_TOF facility at CERN. The preliminary results show important discrepancies with respect to cross sections recommended in nuclear data libraries: only one resonance at 4.98 keV is observed compared to the two resonances expected below 100 keV and an additional resonance at approximately 15.14 keV is observed. In this contribution, the motivation, the measurement and these preliminary results will be presented.

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