Contribution ID: **134** Type: **Contributed talk**

Lifetime measurement of astrophysically relevant 6.793 MeV state ^{15}O

Friday 20 September 2024 10:05 (15 minutes)

The CNO cycle is the main energy production mechanism in stars heavier than our Sun, defining both their evolution and lifespan. The solar ν-flux from the CNO cycle has been recently measured by the Borexino collaboration and it could provide an independent estimate of the solar metallicity, i.e.\ the CN abundance in the core of the sun.
The equilibrium of the CNO cycle is ruled by the ^{14}N$(p,\gamma)^{15}$O reaction, the slowest one of the cycle. Nevertheless, at typical hydrogen burning temperatures, unreachable by direct measurements, the extrapolations are affected by high uncertainty due to the contribution of the sub-threshold state at $E_x = 6.793$~MeV. One significant improvement would be to measure the lifetime of the excited state of interest. Previous attempts suggest that this lifetime lies in the sub-fs range, making it a very challenging measurement. Indeed, literature data are all affected by large uncertainties.
A new lifetime measurement was recently performed at the Legnaro National Laboratories, INFN, using the advanced gamma-ray tracking array AGATA combined with a DSSSD silicon detector. A ^{16}O beam was sent to a target of ^{3}He implanted in a thin Au foil. In the present contribution, preliminary experimental results will be discussed.

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Session Classification: Plenary Session