DETERMINATION OF LEVEL WIDTHS IN ^{15}N USING NUCLEAR RESONANCE FLUORESCENCE

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The stable nucleus ^{15}N is the mirror of the astrophysically important ^{15}O, the product of the leading reaction in the hydrogen burning CNO cycle.
Most of the ^{15}N level widths below the nucleon emission thresholds are known from just one nuclear resonance fluorescence (NRF) measurement published more than 30 years ago, with limited precision in some cases [1]. A recent experiment with the AGATA demonstrator array aimed to determine level widths using the Doppler Shift Attenuation Method (DSAM) in ^{15}O and ^{15}N populated in the ^{14}N + ^{2}H reaction. In order to set a benchmark value for the upcoming AGATA demonstrator data, the widths of several ^{15}N levels have been studied using the bremsstrahlung facility γELBE [2] at the electron accelerator of Helmholtz-Zentrum Dresden-Rossendorf (HZDR). The preliminary data seem to confirm the earlier NRF data. The precision of our new data are on a 10% level for the weak transitions, which have 60% and 100% error bars in the old dataset.
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[1] R. Moreh et al., Phys. Rev. C 23, 988 (1981).
[2] R. Schwengner et al., Nucl. Inst. Meth. A 555, 211 (2005).