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# Coulomb dissociation of $^{14}$O in the context of the hot CNO cycle

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The radiative capture reaction $^{13}$N(p,$\gamma$)$^{14}$O is an important reaction determining the transit from the Carbon-Nitrogen-Oxygen (CNO) cycle to the hot CNO cycle occurring in several astrophysical situations such as super-massive stars, novae etc. Since the direct measurement is difficult due to low cross section, Coulomb dissociation of $^{14}$O in the presence of a heavy target appears to be a robust alternative. In this context, the radiation width ($\Gamma_\gamma$) of the first excited state of $^{14}$O (5.713 MeV) needs to be accurately measured. Discrepancies exist between theoretical works and two experimental measurements till now covering a range of values of $\Gamma_\gamma$ from around 1 eV to 10 eV. We plan to measure Coulomb dissociation of $^{14}$O and deduce the radiative width $\Gamma_\gamma$ with better accuracy using the highly efficient and granular detector array MUST2 at GANIL. This is indeed necessary to conclude if the hot CNO cycle may be ignited at lower densities to prevent the collapse of supermassive stars.

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