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Unbound Excited States of the N=16 Closed Shell Nucleus $^{24}$O
W.F. ROGERS, Westmont College, MONA COLLABORATION — The energies of two low-lying neutron-unbound excited states of $^{24}$O, which were populated by proton-knockout reactions on $^{26}$F, have been measured using the MoNA and LISA arrays in combination with the Sweeper Magnet at the Coupled Cyclotron Facility at the NSCL using invariant mass spectroscopy. The current measurement confirms for the first time the separate identity of $2^+$ and $(1^+)$ neutron-unbound excited states in $^{24}$O with decay energies 0.51(5) MeV state and 1.20(7) MeV, respectively, to the $^{23}$O ground state. These measured decay energies are consistent with two previous lower resolution measurements to within 2σ. The level energies for the two states are computed using the decay energies and the 1-neutron separation energy for $^{24}$O, resulting in 4.70(15) MeV for the $2^+$ state and 5.39(16) MeV for the $(1^+)$ state. Errors in the level energies are dominated by uncertainty in the $^{24}$O neutron separation energy, underscoring the need for a higher resolution $^{24}$O ground state mass measurement. Results will be compared with 3 phenomenological and 2 ab initio model calculations.


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