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**Study of Excited Levels of $^{19}$Ne with the $^{17}$O($^3$He,$n$)$^{19}$Ne Reaction** MICHAEL HORNISH, CARL BRUNE, THOMAS MASSEY, HADI HADIZADEH, ALEXANDER VOINOV, STEVEN GRIMES, AMERICO SALAS, CATALIN MATEI, Ohio University, OHIO UNIVERSITY COLLABORATION — In novae, the survival of the long-lived radioisotope $^{18}$F, which is important in nova gamma-ray astronomy, depends on the parameters of excited states of $^{19}$Ne, which dictate the rates of the $^{18}$F($p$,$\alpha$)$^{15}$O and $^{18}$F($p$,$\gamma$)$^{19}$Ne reactions. Of particular importance is the level structure of $^{19}$Ne above the proton threshold ($E_x$ = 6.411 MeV), where analogs for several states in the mirror nucleus $^{19}$F have not yet been identified in $^{19}$Ne. The present experiment involves a study of the $^{17}$O($^3$He,$n$)$^{19}$Ne reaction and was performed at the Edwards Accelerator Laboratory at Ohio University. Neutron time-of-flight techniques were employed to study $^{19}$Ne excited levels, particularly those between 6 and 7 MeV. In addition to measuring the energy of observed levels and their widths provided they are large enough, the cross section of the reaction to these levels can be compared to Hauser-Feshbach calculations in order to identify the spin of the states. The significance of these levels in relation to proton-induced reactions on $^{18}$F will be discussed.

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