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Study of two missing states of ^{19}Ne affecting the $^{18}\text{F}(p, \alpha)^{15}\text{O}$ reaction rate in classical novae

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Knowledge of the ^{19}Ne resonance information near the proton threshold ($E_x=6.410$ MeV) is important for studying the $^{18}\text{F}(p, \alpha)^{15}\text{O}$ nuclear reaction rate in a classical nova [1-4]. Several states in the vicinity of the proton threshold still have not been observed in ^{19}Ne but were predicted by assuming isospin symmetry from its mirror state in ^{19}F [5,6]. The α -elastic scattering experiment in a Thick Target Inverse Kinematics method (TTIK) was performed at RIKEN using the CNS RI Beam separator (CRIB) with a ^{15}O radioactive beam for investigating the ^{19}Ne level structure [7,8]. Two missing states were identified near the proton threshold, and one of the missing states affects the $^{18}\text{F}(p, \alpha)^{15}\text{O}$ reaction rate. Additionally, the candidates of rotational bands for the alpha cluster structure were measured. Experimental details and results will be discussed in the presentation.

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