

Study of the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction and the structure of ^{19}Ne using a radioactive ^{15}O beam

Thursday, 29 June 2017 17:34 (3 minutes)

The gamma-rays emitted from novae are mainly due to e^+e^- annihilation, and the positrons are mostly from the beta decay of ^{18}F . The amount of ^{18}F in nova is determined by two reaction channels of $^{18}\text{F}(p,\alpha)^{15}\text{O}$ and $^{18}\text{F}(p,\gamma)^{19}\text{Ne}$. The $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction is known as the main destruction channel, and it also affects the reaction rate for calculating the type I x-ray burst model. For this reason, the resonance parameters in ^{19}Ne above the proton threshold at $E_x = 6.411\text{MeV}$ play an important role to understand the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction. Many experiments and theoretical works have been reported on ^{19}Ne resonance states. However, many relevant parameters are still ambiguous. The alpha elastic scattering experiment was performed at the Center for Nuclear Study Radioactive Ion Beam Separator (CRIB). The 7MeV/u ^{15}N primary beam from the AVF cyclotron bombarded a H_2 gas target to produce a ^{15}O radioactive beam, which in turn reacted with a 600 Torr He gas target. By detecting alpha particles using the ΔE -E silicon telescopes, the alpha elastic scattering on ^{15}O was investigated using the thick target method in inverse kinematics for studying the structure of ^{19}Ne . The scanned energy range of ^{19}Ne was $E_x = 3.53\text{--}11.13\text{MeV}$. The experimental details and the results on the structure of ^{19}Ne and the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction will be presented.

Presenter: KIM, Dahee

Session Classification: Poster session (Chair: K. Cho)