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Measurement of ^{58}Ni(^{3}He,n)^{60}Zn reaction to investigate X-ray burst light curve

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X-ray burst is frequently observed thermonuclear explosion events in the universe. Understanding its light curve is inevitable to unveil the properties of neutron stars. The shape of the light curve is sensitive to many nuclear reaction rates. It is shown that the ^{59}Cu(p,γ)^{60}Zn and ^{59}Cu(p,α)^{56}Ni reaction rates have the largest influence on the light curve. These reactions proceed via the ^{59}Cu+p resonance states in ^{60}Zn, thus the spin-parity and decay branch ratio of these states should be determined. We measured the ^{58}Ni(^{3}He,n)^{60}Zn reaction and determined spin-parity of three resonance states at $E_x = 6.36 - 7.13$ MeV for the first time. In the present talk, we will show the method, results, and future plan of the experiment.

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