

Study of cluster degree of freedom in neutron-rich sd-shell nuclei via inelastic alpha scattering (tentative title)

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Cluster degree of freedom of neutron rich nuclei with heavier cluster core like O isotope gets much attention. We propose studies of cluster degree of freedom in neutron-rich ^{28}Ne and ^{32}Mg via inelastic scattering on liquid He target, which is useful to excite cluster energy level. Invariant mass spectroscopy of $^{24}\text{O} + (^{28}\text{Ne})$, $^{24}\text{O} + 2$ and $^{28}\text{Ne} + (^{32}\text{Mg})$ decay channels is performed in order to reconstruct cluster energy levels which appear above emission threshold (S). This method was successfully utilized with SAMURAI for cluster degree of freedom in ^{16}C (NP1112-SAMURAI08). The setup of the experiment is nearly the same as NP1112-SAMURAI08, except that PDCs are placed to obtain $A=Z=2$ particles with sufficient angular coverage as well as appropriately high efficiency for $Z=2$ particles. Other decay channels of symmetric break-up as the $^{32}\text{Mg} \rightarrow x\text{C} + x\text{C} + xn$ reactions are expected to be measured simultaneously by the property of large acceptance of SAMURAI.

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