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Development of Silicon strip detector for cluster knockout reactions

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The ONOKORO project has been launched to understand what kind of clusters exist in the atomic nucleus, and how the formation of the clusters changes depending on the neutron richness. The cluster knockout reactions in inverse kinematics are to be performed using heavy nuclear beams. A detector array TOGAXSI is going to be constructed to measure 100-230 MeV/u light ions emitted from the reactions. In the presentation, the silicon strip detector composing TOGAXSI will be introduced. A performance evaluation experiment of the silicon detectors with a thickness of 100 μm and strip width of 100 μm was performed. The energy losses of light ions are key observables to identify the type of knocked-out clusters. The energy loss spectra with proton beams and alpha particle beams were obtained. In particular, the 230 MeV/u proton beam gives 58 keV at the peak value of the Landau distribution, and its spectrum starts from about 40 keV. The low noise condition has been achieved using APV25s1 chips, and succeeded in measuring them with good detection efficiency.

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