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A silicon vertex tracker for experiments with light particles at SAMURAI

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The tetraneutron has attracted a lot of experimental and theoretical attention in recent years. The observation of a 4-neutron ground state resonance could deliver information about a three nucleons interaction and may contribute to further understanding of the equation of state in neutron stars. The 4n ground state resonance is created by using the $^8\text{He}(p,p\alpha)4n$ knock-out reaction. Three layers of silicon detectors determine the position of the reaction vertex in a liquid hydrogen target. The energy of the resonance is determined through the missing mass method using the four momenta of the scattered charged particles, which are measured in full kinematics with the SAMURAI spectrometer at the RIKEN facility in Japan. We developed a new setup of highly segmented 100 μm thin silicon detectors for vertex reconstruction in a 5 cm LH2 target. The detectors concept, its implementation and performance during the experiment will be presented. This work is supported by the SFB1245 of TU Darmstadt (DFG) and the DFG Cluster of Excellence "Origin and Structure of the Universe".

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