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Recent progress and developments for experimental studies with the SAMURAI spectrometer

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The SAMURAI spectrometer has been designed for various types of experimental studies using high intense beams of exotic nuclei provided by the BigRIPS fragment separator at RI Beam Factory (RIBF). SAMURAI consists of a large-gap superconducting dipole magnet equipped with heavy ion detectors, a large-volume neutron detector array NEBULA, and proton detectors. Since the construction was completed, many experimental studies and developments have been done so far. In addition to the standard detectors, several other experimental devices have been installed. For instance, a prototype of the large neutron detector array NeuLAND developed at GSI, called NeuLAND demonstrator, had been installed at the SAMURAI experimental area to improve the neutron detection efficiency by combining with NEBULA. Thanks to the high neutron detection efficiency with the intense RI beams at RIBF, the setup enabled us to carry out several pioneering studies such as invariant-mass spectroscopy of the unbound nucleus ^{28}O ($Z=8$, $N=20$), which requires detection of four neutrons in coincidence. Developments of other detectors have also been done. In the presentation, recent progress of the SAMURAI spectrometer, developments of experimental devices, and future prospects will be shown and discussed.

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