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Search for η'-mesic nuclei in $^{12}\mathrm{C}(p, dp)$ reaction with the WASA detector at GSI-FRS

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$\eta'(958)$ meson has an exceptionally large mass among pseudoscalar mesons.
The origin of the large mass is considered to be a result of the chiral symmetry breaking and $\mathrm{U}_A(1)$ anomaly.
Many theoretical studies predict the mass reduction of the η' meson ranging in 37 MeV/c^2-150 MeV/c^2 in a nuclear matter where the chiral symmetry is partially restored.
Such a large mass reduction in the nuclear matter is described as an attractive interaction with the nucleus.
The formation of the bound state of η' meson with a nucleus (η'-mesic nuclei) is discussed.

We performed missing-mass spectroscopy in $^{12}\mathrm{C}(p, dp)$ reaction with simultaneous measurement of protons from the decay of η'-mesic nuclei at the fragment separator (FRS) in GSI in 2022 February.
We employed a proton beam with an energy of 2.5 GeV and ^{12}C target with a thickness of 4 g/cm^2.
The missing-mass spectrum was obtained by measuring the forward deuterons momenta with the FRS.
The protons from the decay of the η'-mesic nuclei were identified at the same time by using the WASA detector placed at the F2 focal plane of the FRS.

We report the overview of the experiment and the current status of the analysis.

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