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Spectroscopy of η' -mesic nuclei with WASA at GSI/FAIR

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We are conducting experimental search for η' -mesic nuclei aiming at investigating in-medium properties of the η' meson. The first experiment was performed in 2014 at GSI by measuring the $^{12}\text{C}(p, d)$ reaction near the η' -meson production threshold. While no significant peak structure due to the formation of η' -mesic nuclei was observed, stringent constraints on the formation cross section as well as the η' -nucleus interaction have been deduced. As a next step, we are planning a semi-exclusive measurement of the $^{12}\text{C}(d, dp)$ reaction to extend the experimental sensitivity. In addition to the measurement of the (p, d) reaction, a proton emitted from decay of η' -mesic nuclei will be identified in order to enhance the signal-to-background ratio in the experimental spectrum. The WASA central detector, which had been used at COSY, will be moved to GSI and integrated with the fragment separator FRS to enable the planned semi-exclusive measurement. In this contribution, we will report the present status and future plans of this experiment.

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