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Formation reaction of $\eta'(958)$ -mesic nuclei and $U_A(1)$ anomaly at finite density in NJL model HIDEKO NAGAHIRO, Research Center for Nuclear Physics, Osaka Univ., MAKOTO TAKIZAWA, Showa Pharmaceutical Univ., SATORU HIRENZAKI, Nara Women's Univ. — The huge mass of the $\eta'(958)$ meson is believed to have close connection with the breaking of the axial $U(1)$ symmetry at the quantum level referred as *the $U_A(1)$ anomaly*. There are many theoretical studies for the effects of the $U_A(1)$ anomaly on the η' meson, not only in vacuum, but also at finite temperature and finite density, which suggest the possible character changes of η' at finite temperature and/or finite density. At the present time, however, there exists no experimental information on the property and behavior of the $U_A(1)$ anomaly at finite density. In this presentation, we propose the formation reaction of the η' -mesic nuclei in order to investigate the η' properties, especially its mass shift, at finite density. We apply the NJL model to describe η' properties in nuclear medium, and show the clear relations between NJL parameters and expected reaction spectra, which should be the first step to get deeper insights on $U_A(1)$ anomaly at finite density from experimental data. The η' mass in the medium should provide us important information on the properties of the $U_A(1)$ anomaly in the nuclear medium.

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