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Precision spectroscopy of pionic atoms for deduction of chiral symmetry in nuclear matter

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We report the latest results from the spectroscopy of deeply bound pionic Sn 121 atoms performed at RIBF, RIKEN. We have determined the binding energies and the widths of the pionic orbitals and deduced the pion-nucleus interaction with unprecedented precision. After extensive analysis, we deduced that the chiral condensate at nuclear saturation density is reduced by a factor of $60 \pm 3\%$ (T. Nishi, K. Itahashi et al., Nature Phys. (2023) doi:10.1038/s41567-023-02001-x). We also discuss the analysis status of systematic spectroscopy of pionic Sn isotopes and the future plans to deduce the density dependence of the chiral condensate.

session

E. Hadron and Nuclear Interactions

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