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A comagnetometer using 87Rb and 133Cs atoms in an optical lattice trap

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The electric dipole moment (EDM) has been investigated as a highly sensitive probe for physics beyond the standard model. The EDM of francium (Fr) has attracted attention as a target for measurements of electron's EDM because the enhancement factor of electron's EDM for Fr is 799 [1] and laser cooling and trapping of Fr elongates the interacting time with electric fields.
To evaluate the sources of systematic errors in EDM measurements for Fr, the Zeeman shifts and the light shifts of Rb, and Cs trapped with Fr were simultaneously measured by using Faraday rotations of probe beams. We demonstrated a proof-of-principle experiment using 87Rb and 133Cs trapped in an optical lattice as a comagnetometer. In this presentation, We will report the result of the recent experiment.

[1] N. Shitara, N. Yamanaka, B. K. Sahoo, T. Watanabe, and B. P. Das, J. High Energy Phys. 2021, 124(2021)

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