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Rb atomic magnetometer toward EDM experiment with laser cooled francium atoms[1] TAKESHI INOUE, SHUN ANDO, TAKAHIRO AOKI, HIROSHI ARIKAWA, KEN-ICHI HARADA, TOMOHIRO HAYAMIZU, TAISUKE ISHIKAWA, MASATOSHI ITOH, KO KATO, HIROKAZU KAWAMURA, KOSUKE SAKAMOTO, AIKO UCHIYAMA, Tohoku University, KOICHIRO ASAHI, Tokyo Institute of Technology, AKIHIRO YOSHIMI, Okayama University, YASUHIRO SAKEMI, Tohoku University — A permanent electric dipole moment (EDM) of a particle or an atom is a suited observable to test the physics beyond the standard model. We plan to search for the electron EDM by using the laser cooled francium (Fr) atom, since the Fr atom has a large enhancement factor of the electron EDM and the laser cooling techniques can suppress both statistical and systematic errors. In the EDM experiment, a fluctuation of the magnetic field is a main source of the errors. In order to achieve the high precision magnetometry, a magnetometer based on the nonlinear magneto-optical rotation effect of the Rb atom is under development. A long coherence time of Rb atom is the key issue for the highly sensitive detection of the field fluctuations. The coherence time is limited due both to collisions with an inner surface of a cell contained the Rb atom and to residual field in a magnetic shield. We prepared the cell coated with an anti-relaxation material and measured the relaxation time. A degauss of the shield was performed to eliminate the residual field. We will report the present status of the magnetometer.

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