

Current Monitoring System based on Cesium Magnetometry

P. A. Koss¹, G. Bison², R. T. Dinani³, V. Bonder⁴, L. Bienstman³ and N. Severijns³

¹ Fraunhofer Institute, Freiburg, Germany

² Paul Scherrer Institute, Villigen, Switzerland

³ Katholieke Universiteit, Leuven, Belgium

⁴ ETH, Zurich, Switzerland

We have developed a robust current monitoring system based on atomic magnetic resonance [1]. The system containing an array of four Cesium scalar magnetometers installed inside a dedicated confining magnetic field coil [2]. The magnetometers can operate in all-optical or RF-pulsed modes of operation and monitor drifts in current via drifts in magnetic field of the coil. The system is designed to discriminate the drifts in current from external magnetic perturbations. Ultimately, it would be used in an active current stabilization of a current source and is expected to be implemented in n2EDM experiment [3] at Paul Scherrer Institute to search for electric dipole moment of the neutron.

[1] V. Y. Shifrin, *Rev. Sci. Instrum.* **67**, 833 (1996).

[2] P. A. Koss, *IEEE Magn. Lett.* **8**, 1 (2017).

[3] C. Abel et al., *arXiv: 1811.02340* (2018).