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SQUID-based beam position monitoring for proton EDM experiment SELCUK HACIOMEROGLU, Korea Adv Inst of Sci & Tech — One of the major systematic errors in the proton EDM experiment is the radial B-field, since it couples the magnetic dipole moment and causes a vertical spin precession. For a proton with EDM at the level of 10^{-29} e.cm, 0.22 pG of B-field and 10.5 MV/m of E-field cause same vertical spin precession. On the other hand, the radial B-field splits the counter-rotating beams depending on the vertical focusing strength in the ring The magnetic field due to this split modulated at a few kHz can be measured by a SQUID-magnetometer. This measurement requires the B-field to be kept less than 1nT everywhere around the ring using shields of mu-metal and aluminum layers. Then, the SQUID measurements involve noise from three sources: outside the shields, the shields themselves and the beam. We study these three sources of noise using an electric circuit (mimicking the beam) inside a magnetic shielding room which consists two-layers of mu-metal and an aluminum layer.

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