

## VII. SUPPLEMENTARY

### A. PI stage magnetic field

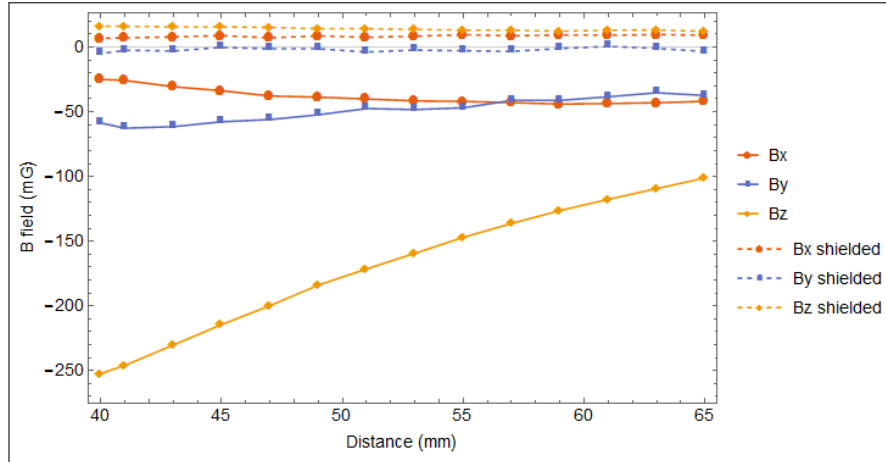


FIG. 11. Measured DC magnetic field produced by PI stage. Z is along the stage translation direction.

The motor technology for the PI stage (voice coil) produces both DC and AC magnetic fields. The DC magnetic field in three directions is measured by a magnetometer as shown in Figure 11. The measured total magnetic field produced by the PI stage is around 250 mG at a distance of 6 cm from atoms in the science cell. The magnetic field is zeroed near the PGC cloud position by three pairs of Helmholtz coils and further suppression of magnetic field by a factor of  $\sim 10$  is also achieved by shielding the PI stage with a mu-metal box, as shown in dashed lines in Figure 11.