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Searching for anomalous spin-spin interactions ATTAALLAH AL-MASI, HIMAWAN WINARTO, JUNYI LEE, MICHAEL ROMALIS, Princeton University — We report our progress and preliminary results of a newly designed experiment to search for anomalous spin-spin interactions using an electron spin source and a nuclear spin co-magnetometer. These interactions can be generated by pseudoscalar axion-like bosons or other light particles beyond the Standard Model. In our experiment, we look for an anomalous correlation between the signal of a Rb-Ne co-magnetometer and the orientation of a SmCo₅ magnet with an iron flux return. The spin source generates a net electron spin while cancelling most of the magnetic field, while the co-magnetometer cancels coupling to ordinary magnetic fields. Several layers of magnetic shielding provide additional suppression of ordinary magnetic field interactions. We collect the data as the direction of the spin source is rotated. We will present the data collected to date and discuss the limiting systematic effects.

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