

# Progress toward a rotating optical Cs-Hg comagnetometer to detect long-range spin-spin interactions

*Saturday, 21 January 2023 16:30 (1h 30m)*

The Hunter Lab searches for long-range spin-spin interactions as a potential fifth fundamental force of nature. Using a Cs-Hg comagnetometer, we measure the long-range effect of unpaired geo-electrons in Earth's mantle on the spin precession frequencies of Hg-199 nuclei in the lab. We seek to optimize our apparatus to increase the sensitivity of our measurements by an order of magnitude from previous experiments. Toward this end, the goal of this research is to modify our comagnetometer and to assemble it on a rotating optical table, allowing us to orient the comagnetometer's magnetic field along each of the cardinal directions. Here, I present the design of our comagnetometer, new modifications to its optical layout, and our initial steps toward construction of the apparatus. We successfully mounted our comagnetometer on the rotating table and aligned the lasers and optics, allowing us to begin preliminary data acquisition.

**Presenter:** HERZ, Bek (Amherst College)

**Session Classification:** Poster Session + Grad/Career Fair