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A Single-walled Carbon Nanotube-based Nanocompass for High Spatial Resolution Magnetometry. JOHNATHAN GOODSELL, JON BRAME, Brigham Young University, STEPHANIE GETTY, Nasa Goddard Space Flight Center, NASA GODDARD SPACE FLIGHT CENTER COLLABORATION — A design for single walled carbon nanotube (SWCNT) nanocompass will be presented. The operating principle exploits the sensitivity of SWCNT electrical properties to strain. The sensor design resembles a classical compass that features an electronic readout. It consists of a suspended network of electrically contacted SWCNTs supporting a magnetically responsive, high aspect-ratio Fe component. During operation, torque on the Fe needle in a magnetic field will induce a strain on the suspended SWCNTs, which is measurable as a change in electronic properties of the device. We will discuss fabrication of the magnetometer, preliminary data, including magnetic field and temperature dependence of the SWCNT network material, and calculations to estimate the nanocompass sensitity to magnetic field. We will also outline future work planned at BYU in collaboration with NASA's Goddard Space Flight Center.

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