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Searching for a relaxion halo with the Global Network of Optical Magnetometers for Exotic physics (GNOME)[1] TATUM WILSON, RAYSHAUN PRESTON, CHRISTOPHER PALM, CHRISTOPHER VERGA, California State University, East Bay, SZYMON PUSTELNY, Jagiellonian University, DEREK JACKSON KIMBALL, California State University, East Bay, GNOME COLLABORATION — The relaxion is a hypothetical ultralight boson proposed to solve the hierarchy problem [Graham, Kaplan, and Rajendran, Phys. Rev. Lett. **115**, 221801 (2015)]. Relaxions are also a dark matter candidate. The relaxion field couples to atomic spins and would lead to an oscillating signal detectable with atomic magnetometers. It is possible that relaxions collect in a halo in the gravitational potential of the Earth or Sun. In this scenario, the relaxion density is much greater than the average dark matter density in the Milky Way, resulting in enhanced signals [Banerjee et al., Communications Phys. **3**, 1 (2020)]. The Global Network of Optical Magnetometers for Exotic physics (GNOME) is an array of geographically separated, time-synchronized, atomic magnetometers whose purpose is to search for correlated signals heralding exotic physics [Afach et al., Physics of the Dark Universe **22**, 162 (2018)]. We discuss a search algorithm for GNOME data based on cross-correlation analysis that targets signals produced by a relaxion halo.

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