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Search for topological defect dark matter with a global network of optical magnetometers (GNOME)

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Ultralight axion-like particles are well-motivated dark matter candidates which can feature topological defects. If Earth encounters such structures, a global pattern of transient signals would be detectable with terrestrial experiments. Here, we report the analysis of three months of data from the Global Network of Optical Magnetometers for Exotic physics searches (GNOME). The data collected consist of correlated measurements from optical atomic magnetometers located in laboratories all over the world. A novel analysis method and improved sensors allowed to expand the search to short duration events (up to 10^{-3} seconds). No statistically significant signal was found in the data, placing new constraints that supersede current bounds in the interaction scale by three orders of magnitude.

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