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Analysis methods for detecting topological defect dark matter with GNOME[1] JOSEPH SMIGA, HECTOR MASIA-ROIG, University of Mainz, GNOME COLLABORATION — Certain dark matter candidates can form macroscopic topological defects (e.g., domain walls) and other structures (e.g., Q-balls) which could constitute a significant source of energy density for dark matter. These structures may form if dark matter consists of axions or axion-like particles (ALPs). In the case of ALPs, the field gradient can couple to fermionic spins, similar to a magnetic field. This coupling becomes significant when the ALP field undergoes a major change, e.g., across a domain wall. In order to observe these structures, the Global Network of Optical Magnetometers for Exotic physics searches (GNOME) project was established. GNOME consists of shielded magnetometers across the globe synchronized by GPS time. A set of analysis methods were developed to find statistically significant signals from structures crossing the network and to assess the sensit ivity of the network.

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