

Abstract Submitted
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Update on the search for dark matter transient signatures using the GPS atomic clocks¹ TYLER DAYKIN, COLIN BRADLEY, GUGLIELMO PANELLI, TREVOR MADDOX, University of Nevada, Reno, BEN ROBERTS, The University of Queensland, GEOFFREY BLEWITT, ANDREI DEREVIANKO, University of Nevada, Reno — A network of quantum sensors, such as the network of 32 Rb and Cs atomic clocks suited aboard the Global Positioning System (GPS), have shown to be a capable aperture for searching for exotic physics, such as clumpy dark matter. Topological Defect dark matter (DM) is an example of clumpy dark matter, which may take the form of a 0D monopoles or Q-balls, 1D strings, or 2D domain walls. For a 2D domain wall, the expected DM signal in the atomic clock data is a sweeping chirp in the clock data as the DM wall propagates the GPS constellation. A Bayesian statistical method is employed to search the 20 years of archival GPS data for transient dark matter signatures from 2D thin domain walls. For each potential dark matter candidate event, we carry out parameter estimation for the velocity, and geometry of the DM encounter. If no dark matter events are observed then powerful constraints may be placed on these models by computing the posterior distribution for the coupling strength.

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