

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Progress on the archival search of the GPS atomic clocks for clumpy dark matter transient signatures¹ TYLER DAYKIN, COLIN BRADLEY, GUGLIELMO PANELLI, KALIA PFEFFER, ZACH WALLER, University of Nevada, Reno, BENJAMIN ROBERTS, University of Queensland, Australia, MAXIM POSPELOV, University of Minnesota, Twin Cities, GEOFFREY BLEWITT, ANDREI DEREVIANKO, University of Nevada, Reno, GPS.DM COLLABORATION — A network of quantum sensors, such as the network of Rb atomic clocks aboard the Global Positioning System (GPS), have shown to be capable for searching for exotic physics, such as clumpy dark matter (DM). An example of clumpy dark matter of particular interest to our current search is Topological Defect (TD) dark matter, which may take the form of 0D monopoles or Q-balls, 1D strings, or 2D domain walls. For a 2D domain wall, we expect a well defined DM signature in the atomic clock data as the DM wall propagates through the constellation. Using a Bayesian statistical method, a search through the 20 years of archival GPS data for transient dark matter signatures from 2D thin domain walls was performed. A strict χ^2 filter, expecting only 1 false positive in 100 years, in conjunction with the signal to noise (SNR) filter was developed to eliminate false positive events arising from poor matching to the bank of DM signal templates. Parameter estimation was performed for each potential DM candidate event, investigating the velocity, and geometry of the DM encounter. Details of these preliminary results from the archival GPS data search will be presented at the conference.

¹Supported by the U.S. National Science Foundation

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Date submitted: 08 Jan 2021

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