Abstract Submitted
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Applying the matched-filter technique to the search for dark matter transients with networks of quantum sensors[1] GUGLIELMO PANELLI, Department of Physics, University of Nevada, Reno, 89557, USA, BENJAMIN ROBERTS, School of Mathematics and Physics, the University of Queensland, Brisbane, QLD 4072, Australia, ANDREI DEREVIANKO, Department of Physics, University of Nevada, Reno, 89557, USA, GPSDM COLLABORATION COLLABORATION — Nearly two decades of high accuracy data from atomic clocks aboard the Global Positioning System (GPS) satellites is publicly available from the geoscience community. This archival data can be used for searches for exotic physics, such as direct dark matter searches. Here we explore the application of the matched-filter technique as a detection strategy for macroscopic dark matter objects sweeping through the GPS network. Such "clumpy" dark matter objects would register as transients passing through the network at galactic velocities. This sweep would result in a correlated propagation of atomic clock glitches in the archival GPS data. We apply the matched-filter technique to simulated GPS atomic clock data and study its utility and performance. The analysis and the developed methodology have a wide applicability to other networks of quantum sensors.

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