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## Searching for dark matter signatures in 20 years of GPS atomic clock data

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Despite the overwhelming cosmological evidence for the existence of dark matter, and the considerable effort of the scientific community over decades, there is no evidence for dark matter in terrestrial experiments. The GPS.DM observatory uses the existing GPS constellation as a 50,000 km-aperture sensor array, analysing the satellite and terrestrial atomic clock data for exotic physics signatures. In particular, the collaboration searches for evidence of transient variations of fundamental constants correlated with the Earth's galactic motion through the dark matter halo.

The initial results of the search lead to an orders-of-magnitude improvement in constraints on certain models of dark matter [1].

I will discuss the initial results and future prospects, including the method used for processing the data, and the "GPS simulator" and dark-matter signal generator we built to test to methods [2].

[1] B. M. Roberts, G. Blewitt, C. Dailey, M. Murphy, M. Pospelov, A. Rollings, J. Sherman, W. Williams, and A. Derevianko, *Nat. Commun.* 8, 1195 (2017).

[2] B. M. Roberts, G. Blewitt, C. Dailey, and A. Derevianko, *Phys. Rev. D* 97, 083009 (2018).

### Consider for promotion

No

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