

First Results of the GPS.DM Observatory: Search for Dark Matter and Exotic Physics with Atomic Clocks and GPS Constellation

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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. There already exists more than 10 years of good clock timing data that can be used in the search.

This type of search is particularly sensitive to exotic forms of dark matter, such as topological defects. We will present an update on the search.

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A. Derevianko and M. Pospelov, Nat. Phys. 10, 933 (2014).

Summary

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