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Searching Dark Matter with Galileo satellites

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The search of transient space variation of fundamental constant, like the fine structure constant or the proton-to-photon mass ratio in the neighborhood of the Earth, is the interest of last decades. In this context, atomic clocks can present an astonishing tool for study fundamental physics in terms of detection of a possible frequency shift, which is a result of GPS network interaction with Dark Matter objects.

In this work, we consider a system of Galileo satellites with a passive H-maser on boards to test transient violation using propagation of electromagnetic signal. Here, we present data analysis based on 90-days measurement campaign carried during January – March 2021. The novelty of this work is the combination of measurements (clocks and orbit products, SLR measurements) for the search for DM transients, with a special care to the systematic effects.

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