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Searching for scalar field dark matter with hyperfine transitions in alkali atoms

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Fundamental constants such as masses and coupling constants of elementary particles can have small temporal and spatial variations in the scalar field dark matter model. These variations entail time oscillations of other constants, such as the Bohr and nuclear magnetons, Bohr radius and the hyperfine structure constant. In the presence of an external magnetic field, these oscillations induce hyperfine transitions in atoms and molecules. We determine the probability of magnetic dipole hyperfine transitions, caused by the oscillating fundamental constants, and propose an experiment that could detect the scalar field dark matter through this effect. This experiment may be sensitive to the scalar field dark matter with mass in the range $1\ \mu\text{eV} < m_\phi < 100\mu\text{eV}$

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