

Abstract Submitted  
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**Sensitive imaging of electromagnetic fields with cold polar molecules** SERGEY ALYABYSHEV, University of British Columbia, MIKHAIL LEMESHKO, Institute for Theoretical Atomic, Molecular, and Optical Physics Harvard-Smithsonian Center for Astrophysics, ROMAN KREMS, University of British Columbia — Detection of electromagnetic fields from rf to infrared frequency range is required for numerous applications ranging from test of fundamental symmetries to bioimaging. We propose to use polar paramagnetic molecules, such as SrF, CaH and NH, for sensitive parallel detection of electromagnetic fields. We discuss several methods of detection of both electric and magnetic field components in a wide range of detectable frequencies up to a few THz with high sensitivity and  $\mu\text{m}$  spatial resolution. Our calculations show that, using a gas of SrF molecules, it is possible to achieve sensitivity to ac fields that is two orders of magnitude higher than with ultracold Rb atoms [1]. Various applications are discussed.

[1] P.Bohi, M.F.Riedel, T.W.Hansch, and P.Treutlein, Appl. Phys. Lett. 97, 051101 (2010).

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