Detecting Dark Matter with Molecules JESUS PEREZ-RIOS, Fritz-Haber-Institut der Max-Planck-Gesellschaft, Faradayweg 4-6, D-14195 Berlin, Germany, HARIKRISHNAN RAMANI, Berkeley Center for Theoretical Physics, Department of Physics, University of California, Berkeley, California 94720, USA, OREN SLONE, Princeton Center for Theoretical Science, Princeton University, Princeton, New Jersey 08544, USA, ROUVEN ESSIG, C. N. Yang Institute for Theoretical Physics, Stony Brook University, New York 11794-384, USA — The evidence for the existence of dark matter, which makes up about 85% of the matter density in the Universe, is overwhelming. Efforts to detect galactic dark matter particles in the laboratory are crucial for revealing the particle nature of dark matter. We propose a detection concept based on molecular excitations caused by the dark matter-nucleus scattering within the molecule. By mixing molecules of different isotopes, including those with an odd number of neutrons, we obtain sensitivity to both spin-independent interactions and spin-dependent interactions with the neutron. In addition, we explore various halides and hydrides molecules, which can provide sensitivity to spin-dependent interactions with the proton.

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