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A protocol to realize triatomic ultralong range Rydberg molecules in an ultracold KRb gas ROSARIO GONZALEZ-FEREZ, Departamento de Fsica Atmica, Molecular y Nuclear, Facultad de Ciencias, Universidad de Granada, Granada, Spain, SETH T. RITTENHOUSE, Department of Physics, The United States Naval Academy, Annapolis, Maryland 21402, USA, PETER SCHMELCHER, Zentrum fuer Optische Quantentechnologien, Universitaet Hamburg, 22761 Hamburg, Germany, H.R. SADEGHPOUR, ITAMP, Harvard-Smithsonian Center for Astrophysics 60 Garden St., Cambridge, Massachusetts 02138, USA — Ultralong-range polyatomic Rydberg molecules might be formed when a heteronuclear diatomic molecule is bound to a Rydberg atom [1]. The binding mechanism appears due to the anisotropic scattering of the Rydberg electron from the permanent electric dipole moment of the polar molecule. We propose an experimentally realizable scheme to produce these triatomic ultralong-range Rydberg molecules in ultracold KRb traps, which might use the excitations of both postassium or rubidium atoms. By exploiting the Rydberg electron-molecule anisotropic dipole interaction, we induce a near resonant coupling of the non-zero quantum defect Rydberg levels with the KRb molecule in N=0 and N=2 rotational levels. This coupling enhances the binding of the triatomic ultralong-range Rydberg molecule and produces favorable Franck-Condon factors [2]. [1] R. Gonzalez-Ferez et al, New J. Phys. **17**, 013021 (2015). [2] R. Gonzalez-Ferez et al, J. of Phys. B.: At. Mol. Opt. Phys. in press(2020).

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