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**Unexpected charge effects in Mott insulators: Magnetoelectric behavior of Cr-trimer complexes** OSCAR E. AYALA-VALENZUELA, ROSS D. MCDONALD, MARY C. GURAK, C. BATISTA, P. SENGUPTA, National High Magnetic Field Laboratory, Los Alamos National Laboratory, B. MALLICK, A.V. MUDRING, Ruhr-University Anorganische Chemie, Bochum, Germany, M. JAIME, National High Magnetic Field Laboratory, Los Alamos National Laboratory, J.A. MYDOSH, Kamerlingh Onnes Laboratory, Leiden University, The Netherlands — In this work we present measurements of the dielectric response as a function of magnetic field of Cr-trimer systems, which combined with recent theoretical developments indicates a magnetoelectric behavior evidenced by a purely electronic mechanism. Magnetic field strengths of the order of the exchange interaction ($J \sim t^2/U$) strongly perturb the spin texture, which is evident as steps and plateaus in the magnetization behavior. The corresponding shifts in dielectric properties reveal the role of the charge degrees of freedom. Electron Spin Resonance (ESR) results indicates which terms in the effective spin Hamiltonian are responsible for the magnetoelectric coupling. Furthermore, we observe novel dipole-active ESR give rise to the possibility of negative refractive indices under special conditions.

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