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Resonant Higher Order Scattering in Double Perovskites JAKOB ANDREASSON, JOAKIM HOLMLUND, MIKAEL KÄLL, LARS BÖRJESSON, Dept. of Applied Physics, Chalmers Univ. of Tech. and Göteborg Univ., SE-41296, Göteborg, Sweden, STEFAN NALER, JOAKIM BÄCKSTRÖM¹, MIKAEL RÜBHAUSEN, Institut für Angewandte Physik, Univ. Hamburg, Jungiusstraße 9, D-20355 Hamburg, Germany, ABUL K. AZAD, STEN ERIKSSON, Studsvik Neutron Research Lab., Uppsala Univ., 61182 Nyköping, Sweden and Dept. of Inorg. Chem., Göteborg Univ., 41296 Göteborg, Sweden — Resonant and non-resonant higher order Raman scattering in the double perovskites $\text{La}_{2-x}\text{Sr}_x\text{FeCrO}_6$ ($x = 0, 0.33, 0.66, 1$) and $\text{Ba}_2(\text{Sr}_2)\text{FeWO}_6$ is investigated. The B-site disordered compound $\text{La}_2\text{FeCrO}_6$ displays an exceptional series of resonant higher order excitations for ≈ 514 nm (2.42 eV). This feature is attributed to defects, in the form of oxygen vacancies, resulting in a localized resonant electron-phonon coupling effect similar to the Franck-Condon effect predicted in the perovskite structured manganites. The resonant state is critically sensitive to Sr doping and . Higher energy excitations in the compounds $\text{Ba}_2(\text{Sr}_2)\text{FeWO}_6$ are shown to be of non-resonant multiphonon character.

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