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Dynamics and Spectral Weights in Transition-Metal K-edge Resonant Inelastic X-ray Scattering¹ MICHEL VAN VEENENDAAL, Northern Illinois University, KEN AHN, Advanced Photon Source, Argonne National Laboratory, ART FEDRO, Northern Illinois University — We discuss the trends in resonant inelastic x-ray scattering (RIXS) at the transition-metal K-edge for metals, semiconductors, and strongly correlated systems. We find that the inelastic spectral weight is not determined by the total energy of the shake-up structure, as is expected from simple considerations, but by the excitonic nature of the core hole and the valence electrons. The asymmetry between electron and hole excitations is emphasized and shown to be important in explaining the RIXS spectrum. The results differ significantly from lowest-order perturbation theory results that predict that the probability of exciting a certain shake-up structure depends only on its total energy.

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