Abstract Submitted
for the TSF06 Meeting of
The American Physical Society

Maximal Violation of the Two-Step Model of Auger Decay in Auger Cascade Processes[1] RAJALAKSHMI SUNDARAMOORTHY, ALEX WEISS, University of Texas at Arlington, STEVEN HULBERT, National Synchrotron light Source, Brookhaven National Lab, ROBERT BARTYNSKI, Rutgers University, UTA TEAM, NSLS, BNL COLLABORATION, RUTGERS UNIVERSITY COLLABORATION — The two step model assumes Auger decay processes to be independent of the manner of the creation of the initial core hole and that the screening time is short compared to the core-hole life time. Auger-Photoelectron Spectroscopy(APECS) and Auger-Auger Coincidence Spectroscopy (AACS) were used to show that the spectra associated with Mn MVV transitions in which the initial M core hole was created by a prior LMM Auger transition is much wider that the spectra associated with MVV transitions in which the M hole was created by direct photoemission. The increased energy width of the MVV transitions that follow LMM decays strongly suggests the involvement of valence hole(s) created in the prior cascade step that have not been filled at the time of the subsequent Auger decay thus violating the two-step model. The energetics of the Auger cascade processes is modeled in terms of correlation integral(s) and convolution integral(s) over the valence band density of states. Comparisons with recent Auger-Auger Coincidence studies of Ag and Pd will be made.

[1]Welch Foundation, NSF DMR98-12628, NSF DMR98-01681, and DOE DE-AC02-98CH10886.

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Date submitted: 12 Sep 2006 Electronic form version 1.4