

Electron and Spin Dynamics in Co/Cu(001) During Laser-Induced Demagnetization

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Abstract. The evolution of the electronic band structure of the even simple ferromagnets during laser-induced demagnetization has been under debate for decades. Using time- and spin-resolved photoelectron spectroscopy, we follow the evolution of electronic properties of cobalt after the excitation with an ultra-short laser pulse. We show that the laser induced changes reach deep into the electronic band structure and we find that the ferromagnetic-paramagnetic phase transition cannot be explained by a loss of the exchange splitting of the spin-polarized bands. Instead, following the excitation, the band structure shows rapid band mirroring which is a clear signature of magnon generation. Our results help to understand spin dynamics in ferromagnetic systems and provide insight into the transient processes within the band structure relevant to femtosecond demagnetization.