

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

“String excitations” of a hole in a quantum antiferromagnet and ARPES data EFSTRATIOS MANOUSAKIS, Physics Department, Florida State University, USA, and Physics Department, University of Athens, Greece — Recently, high resolution angle-resolved photoelectron spectra (ARPES) from cuprates have been reported where an anomalous high-energy dispersion was identified. We suggest that these ARPES results reveal the internal structure of the hole quasiparticle in quantum antiferromagnets and more importantly it is evidence for the existence of “string-excitations” which validate early predictions based on the $t - J$ and related models. The following features of the ARPES results are all in agreement with predictions without adjusting any parameters: (a) the energy-momentum dispersion of the string-excitations, (b) the manner in which the spectral weight is transferred to higher energy string excitations, and (c) the vanishing of the quasiparticle spectral weight near the Γ point.

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Date submitted: 20 Nov 2006

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