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**Role of phonons and of finite temperature on the spectral function of a single hole in a quantum antiferromagnet** SATYAKI KAR, Department of Physics, Florida State University, Tallahassee, FL, 32306-4350, EFSTRATIOS MANOUSAKIS, Department of Physics and MARTECH, Florida State University, Tallahassee, FL, 32306, and Department of Physics, University of Athens, Greece — Thermal broadening as well as the role of optical phonons are studied for a single-hole in a quantum antiferromagnet within the  $t$ - $J$  (and the  $t$ - $t'$ - $t''$ - $J$ ) model. The non-crossing approximation (NCA) as well as the effect of vertex corrections (up to second order) are used to describe the coupling to spin waves and phonons up to intermediate range of coupling. Phonons at finite temperature are seen to broaden the quasiparticle peak and the string excitations are found to survive up to an intermediate phonon-coupling regime beyond which the NCA is expected to break down. The qualitative features of our results compare reasonable well with the recent high resolution angular resolved photoelectron spectroscopy.

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