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Hole dynamics in a 2D doped quantum antiferromagnet within the non-crossing approximation SATYAKI KAR, University of North Florida, EFSTRATIOS MANOUSAKIS, Florida State University; University of Athens, Greece — We study the doping evolution of the hole and magnon spectral functions of the two-dimensional $t-J$ and $t-t'-t''-J$ models by solving the Dyson's equations self-consistently within the non-crossing approximation. The doping dependence of the staggered magnetization and the hole spectral function are calculated for doping concentration where there is antiferromagnetic order for both of these models. We find that the intensity plot of the hole spectral function has characteristics similar to the “waterfall” features observed in the underdoped cuprates by ARPES.

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