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Understanding the interplay between charge, spin and phonons in the spectral properties of the 1D Hubbard-Holstein model MOHAMMAD SOLTANIEH-HA, ALBERTO NOCERA, ADRIAN FEIGUIN, Northeastern University, Boston, MA 02115 — We present an analytical construction to calculate the spectral functions of the Hubbard-Holstein model in the limit of strong electron-phonon coupling, and in the limit of $U \rightarrow \infty$. We argue that in this limit, the phonons only couple to the charge, and not the spin. The resulting spectral function can be understood as a convolution of three contributions, originating from the charge, the spin, and the phonons, in a similar fashion as the large U limit of the Hubbard chain. We support the analytical results with extensive Density Matrix Renormalization Group simulations. We recognize and interpret the signatures of the three contributions in the final spectrum and we discuss their experimental implications.

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