Discontinuous quenching of quasi-particle states in nonequilibrium dynamical mean-field theory\textsuperscript{1} RYAN HEARY, JONG HAN, SUNY at Buffalo — In an effort to model strongly correlated heterojunctions in nonequilibrium we construct a nonequilibrium dynamical mean-field theory for the Hubbard model where each lattice site is a superposition of a left-moving and right-moving state. The left and right movers have the respective chemical potentials, $\mu_L = \frac{\Phi}{2}$ and $\mu_R = -\frac{\Phi}{2}$, where $\Phi$ is the chemical potential bias. The quasi-particle properties are calculated as a function of the Coulomb interaction, $U$, and $\Phi$. As the chemical potential bias is turned on we find that the quasi-particles become strongly renormalized. When $U_d < U < U_c$, where $U_c$ is the critical $U$ for the metal-insulator transition in equilibrium and $U_d \sim 0.7U_c$, the quasi-particles are destroyed discontinuously at a critical chemical potential bias, $\Phi_d$. For $U < U_d$ the quasi-particles disappear continuously as $\Phi$ is enhanced. Therefore $U_d$ is the critical $U$ which defines the boundary between the quasi-particles being continuously and discontinuously suppressed. By defining the quasi-particle energy, $\epsilon_{QP}$, as the half-width at half-maximum of the quasi-particle peak, we find that for $\Phi/\Phi_d \sim 0.4$, the quasi-particle energies scale to a single curve.

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