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Bound states, symmetry breaking, and memory effects in doped $t-J$ Y-junctions JURIJ SMAKOV, SASHA CHERNYSHEV, STEVE WHITE, UC Irvine — The effect of strong electronic correlations on the properties of the weakly doped Y-junctions is studied within the $t-J$ and $t-J_z$ models using an analytical Green's function approach and DMRG. It is shown that the bound state at the junction depends counter-intuitively on the strength of the correlation: the bound state exists for the range of $0 < J/t < J/t|_c$, where at $J = 0$ ($U \to \infty$) the problem maps on the free-electron one, while the bound state disappears above the critical value of $J/t|_c \approx 0.47$ as the correlations weaken. Such a bound state also shows a dynamic symmetry breaking between the legs of the junction: the charge density is distributed unevenly among the legs. It is also demonstrated that the Y-junction with the Ising anisotropy can exhibit peculiar type of memory effects for charge transport.

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