

Abstract Submitted
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Fractionally Charged Solitons in the t-J model on a diagonal two-leg ladder YIFAN JIANG, Institute for Advanced Study, Tsinghua University, HONGCHEN JIANG, Department of Physics, Stanford University, HONG YAO, Institute for Advanced Study, Tsinghua University, STEVEN KIVELSON, Department of Physics, Stanford University — We define a new class of "diagonal" t-J ladders rotated by $\pi/4$ relatively to the canonical lattice directions of the square lattice, and study it using density matrix renormalization group (DMRG). We focus on the two-leg ladder with a doped hole concentration near $x = 1/4$. At exactly $x = 1/4$, the system forms a period 4 CDW and exhibits spin-charge separation. Slightly away from $1/4$ doping, we observe several topologically distinct types of solitons with well defined fractionalized quantum numbers. Remarkably, given the absence of any small parameters, the effective masses of the various emergent solitons differ by over four orders of magnitude.

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