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The RKKY Interaction and the Nature of the Ground State of Double Dots in Parallel MANAS KULKARNI, Stony Brook University and Brookhaven National Laboratory, ROBERT KONIK, Brookhaven National Laboratory — We argue through a combination of slave boson mean field theory and the Bethe ansatz that the ground state of closely spaced double quantum dots in parallel are Fermi liquids. We do so by studying the dots conductance, impurity entropy, and spin correlation. In particular we find that the zero temperature conductance is characterized by the Friedel sum rule, a hallmark of Fermi liquid physics, and the impurity entropy vanishes in the limit of zero temperature, indicating the ground state is a singlet. This conclusion is in contradistinction to a number of numerical renormalization group studies. We suggest a possible reason for the discrepancy. Our findings are also consistent with a $1/N$ diagrammatic approach to the same setup.

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