

Abstract Submitted  
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**One-dimensional fermion pairing**<sup>1</sup> RAFAEL MENDOZA, Posgrado en Ciencias Físicas, UNAM, M. DE LLANO, Instituto de Investigaciones en Materiales, UNAM, M. FORTES, M.A. SOLIS, Instituto de Física, UNAM, Mexico — We study fermion pairing in a one-dimensional fermion gas at  $T = 0$  interacting via a generalized two-body attractive, separable interaction [1] where the effective range was varied from zero (delta potential) to infinity. The binding energy of fermion pairs with zero center-of-mass momentum increases as a function of the interaction strength and decreases as a function of the interaction range for a given strength. Fermion pairs with finite, nonzero center-of-mass momentum have an energy dispersion relation that exhibits two excitation branches: One phonon-like for low momentum which, for weak coupling, can disappear before the second, roton-like excitation appears for values of the momentum larger than  $2k_F$  and only above a minimum threshold interaction strength value. The interaction range has the effect of privileging the quadratic over the linear relation dispersion as it goes from short to long range. This study completes a trilogy initiated for 3D [2] and later for 2D [3]. [1] P. Nozières y Schmitt-Rink, *J. Low Temp. Phys.* 59, 195 (1985); [2] M. Casas et al., *Physica C* 295, 93 (1998); [3] S.K. Adhikari et al., *Phys. Rev. B* 62, 8671 (2000).

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