

# Induced pairing interaction in nuclei and neutron stars

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Medium polarization effects renormalize in an important way single-particle motion, the dressed nucleons displaying effective masses<sup>1</sup>, finite lifetimes<sup>2</sup>, etc. These renormalization effects are at the basis of the phenomenon of parity inversion observed in halo nuclei<sup>3,4</sup>, but also of the fact that mean field theory and bare nucleon-nucleon interaction account for only a fraction of the pairing gap<sup>5,6</sup>. Widely different values for the pairing gap in the inner crust of neutron stars have been reported in the literature<sup>7</sup>. While the special dynamics arising from the coexistence of a nuclear (Wigner) lattice with a sea of free neutrons typical of this many-body system still awaits a satisfactory solution, renormalization effects are expected to play a central role<sup>8</sup>.

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<sup>2</sup> G.F. Bertsch et al, Rev. Mod. Phys. **55** (1983) 287

<sup>3</sup> G. Gori et al, Phys. Rev. **C69** (2004) 041302(R)

<sup>4</sup> F. Barranco et al, Eur. Phys. J. **A11** (2001) 385

<sup>5</sup> F. Barranco et al, Eur. Phys. J. **A21** (2004) 57

<sup>6</sup> D. M. Brink and R. A. Broglia, *Nuclear Superfluidity*, Cambridge University Press, Cambridge (2005)

<sup>7</sup> U. Lombardo and H. J. Schultze, in *Physics of neutron star interiors*, D. Blaschke, N. K. Glendenning and A. Jadrakian, eds., Springer (2001) p. 30, and refs. therein

<sup>8</sup> G. Gori et al, Nucl. Phys. **A731** (2004) 401; G. Gori et al, Phys. Rev. **C72** (2005) 11302