

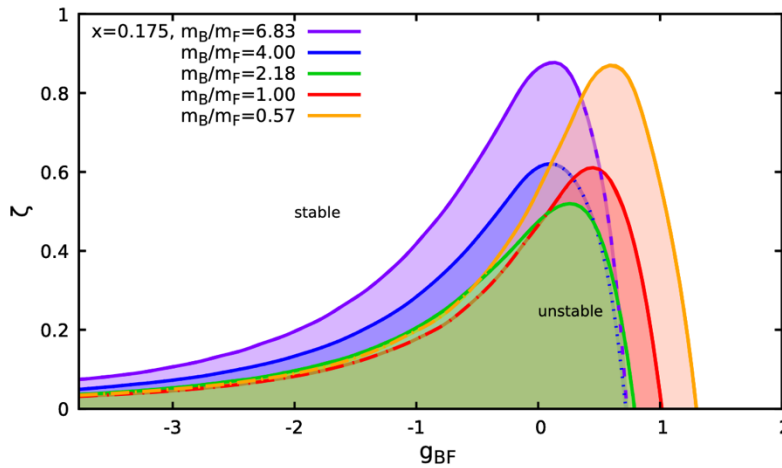
# Boson-fermion pairing and stability of resonant Bose-Fermi mixtures

Pierbiagio Pieri<sup>1,2</sup>

1. Dipartimento di Fisica e Astronomia "Augusto Righi", Università di Bologna, Via Irnerio 46, I-40126, Bologna, Italy,
2. INFN, Sezione di Bologna, Viale Bertini Pichat 6/2, I-40127, Bologna (BO), Italy

**Abstract:** I will present novel results on the stability of resonant Bose-Fermi mixtures suggesting that a metastable state was observed in a recent experiment. Then, I will discuss the extension of our calculations to 2D systems.

I will review recent work on Bose-Fermi mixtures with an attractive interaction inducing pairing between bosons and fermions. After discussing a recent experiment on this system [1], which has confirmed predictions obtained by us some time ago within a many-body diagrammatic approach [2], I will present novel results for the compressibility [3] (see Fig. 1) that suggest a metastable nature for the many-body phase observed in [1]. Then, I will discuss the extension of our calculations to two-dimensional Bose-Fermi mixtures and present novel results for 2D Bose-Fermi mixtures obtained with both perturbative [4] and non-perturbative techniques [5].



**Fig. 1** Stability phase diagram for a Bose-Fermi in the plane  $\zeta$  vs  $g_{BF}$ , with  $\zeta = k_F a_{BB}$  and  $g_{BF} = (k_F a_{BF})^{-1}$ , where  $k_F = (6\pi^2 n_F)^{1/3}$  is the Fermi wave-vector and  $a_{BB}$  and  $a_{BF}$  are the boson-boson and boson-fermion scattering lengths, respectively. The results are presented for concentration  $x = n_B/n_F = 0.175$  and different mass ratios.

## References

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