Minicolloque n° PMQ32 **X Oral** **☐ Poster**

Perturbative calculation of the energy of an impurity immersed in a Fermi superfluid

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The polaron problem has been studied since the fifties and the seminal work of Landau on electrons in crystalline solids. Here, we study the case of an impurity in a two-component Fermi superfluid in order to describe recent experiments consisting of a Bose-Einstein condensate immersed in a Fermi superfluid [1]. We use second-order perturbation theory and Random-Phase Approximation on the fermionic bath to obtain results for any value of the fermion-fermion scattering length for both the polaron energy and its effective mass. These results are consistent with experimental observations in ultracold atomic gases [1].

[1] Ferrier-Barbut *et al.*, Science. 345:1035-1038 (2014)

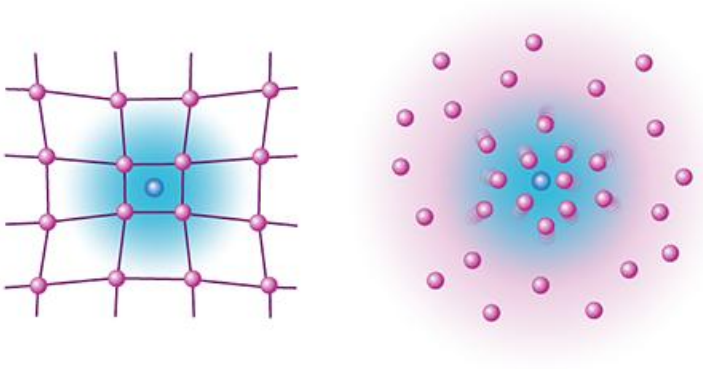

Figure 1 : On the left : an electron in a crystalline solid. On the right : an impurity in an atomic gas.