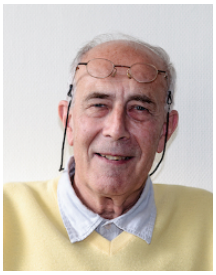

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FFLO correlations in polarized ultracold Fermi gases

mercredi 22 mars 2023 11:45 (30 minutes)

Quite generally, an imbalance between the densities of spin-up and spin-down fermions hinders pairing and superfluidity in two-component attractive Fermi gases. The Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) phase, in which pairs condense at a finite value of center-of-mass momentum to compensate for the mismatch of the two Fermi surfaces, was proposed many years ago as a possible superfluid phase compatible with a finite polarization. In this talk, I will discuss how significant precursor FFLO fluctuation effects appear already in the normal phase of polarized Fermi gases at finite temperature [1], and how they could be observed experimentally. At zero temperature [2], I will discuss how the quasi-particle parameters of the normal Fermi gas are changed when approaching an FFLO quantum critical point. Within a fully self-consistent t-matrix approach we find that the quasi-particle residues vanish, and the effective masses diverge at the FFLO quantum critical point, with a complete breakdown of the quasi-particle picture that is similar to what is found in heavy-fermion materials at an antiferromagnetic quantum critical point.

References

[1] M. Pini, P. Pieri, and G. Calvanese Strinati, Phys. Rev. Res. **3**, 043068 (2021).
[2] M. Pini, P. Pieri, and G. Calvanese Strinati, arXiv:2211.15529.

Auteur principal: PIERI, Pierbiagio (University of Bologna)

Orateur: PIERI, Pierbiagio (University of Bologna)

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