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Theory of quantum matter

Mercredi 12 Avril 2023, 14 :00
LPTHE, LPTHE library, towers 13-14, 4th floor
Domaines : cond-mat

Titre : *Can deep sub-wavelength cavities induce Amperean superconductivity in a 2D material ?*

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Résumé : *Amperean superconductivity is an exotic phenomenon stemming from attractive effective electron- electron interactions (EEEIs) mediated by a transverse gauge field. Originally introduced in the context of quantum spin liquids and high-Tc superconductors, Amperean superconductivity has been recently proposed to occur at temperatures on the order of 1-20 K in two-dimensional, parabolic-band, electron gases embedded inside deep sub-wavelength optical cavities. I will first generalize the microscopic theory of cavity-induced Amperean superconductivity to the case of graphene and then argue that this superconducting state cannot be achieved in the deep sub-wavelength regime. In the latter regime, indeed, a cavity induces only EEEIs between density fluctuations rather than the current-current interactions which are responsible for Amperean pairing.*