

Phonon-mediated spin-polarized superconductivity in altermagnets

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We have considered the possibility of phonon-mediated unconventional superconductivity in a recently discovered new class of antiferromagnets, dubbed altermagnets. Within a weak-coupling approach, and using a minimal band model for altermagnets [1], we have found a dominant superconducting instability odd in momentum and even in spin with fully spin-polarized Cooper pair [2]. We discuss the origin of this unusual result in terms of the spin-structure of the altermagnetic Fermi surface, in combination with the momentum-space structure of the effective phonon-mediated electron-electron interactions on the Fermi surface. [1] B. Brekke, A. Brataas, and A. Sudbø, PRB 108, 224421 (2023). [2] K. Leraand, K. Mæland, and A. Sudbø. Work supported by Norwegian Research Council, through Grant No. 262633, “Center of Excellence on Quantum Spintronics”, as well as Grant No. 323766.

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