p+ip Fermi superfluids: old results and new questions

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Liquid helium-3-A is the first laboratory system (along with its sister B state) confidently believed to undergo Cooper pairing in a non-s-wave state, and it has been widely used as an analog for certain metallic systems such as strontium ruthenate, with both falling into the class of "2D p + ip" Fermi superfluids. One of the most fascinating predictions concerning this class of systems is that they may be able to sustain exotic quasi-fermionic excitations such as Majorana fermions, and that these may then be used to implement topological quantum computation (TQC). I review the current state of play regarding the p + ip Fermi superfluids, and call attention to some questions about them, particularly ones relevant to TQC, which I believe are currently unresolved.

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