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Possible charge analogues of spin transfer torques in bulk superconductors[1] ION GARATE, Université de Sherbrooke — Spin transfer torques (STT) occur when electric currents travel through inhomogeneously magnetized systems and are important for the motion of magnetic textures such as domain walls. Since superconductors are easy-plane ferromagnets in particle-hole (charge) space, it is natural to ask whether any charge duals of STT phenomena exist therein. We find that the superconducting analogue of the adiabatic STT vanishes in a bulk superconductor with a momentum-independent order parameter, while the superconducting counterpart of the nonadiabatic STT does not vanish. This nonvanishing superconducting torque is induced by heat (rather than charge) currents and acts on the charge (rather than spin) degree of freedom. It can become significant in the vicinity of the superconducting transition temperature, where it generates a net quasiparticle charge and alters the dispersion and linewidth of low-frequency collective modes.

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