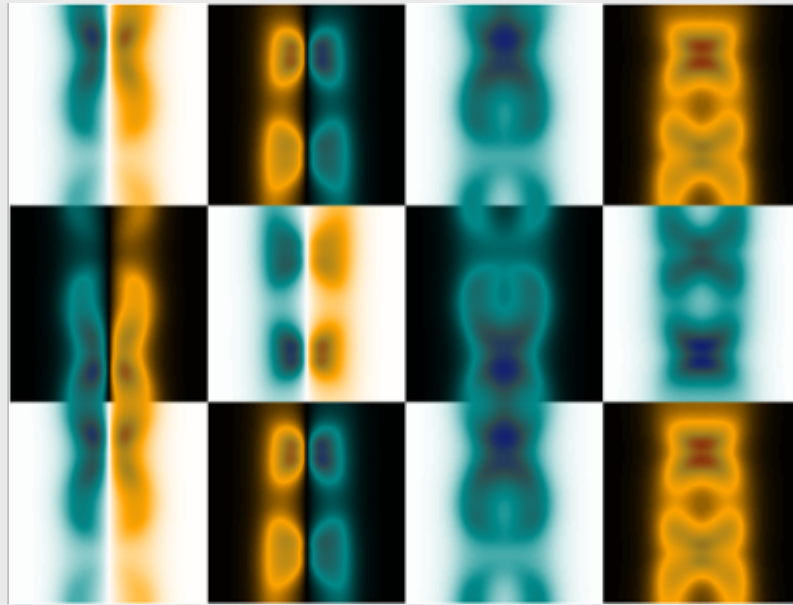


Reversible Thermal Diode and Energy Harvester with a Superconducting Quantum Interference Single-electron Transistor



Articles: published in [Applied Physics Letters](#) by [Rafael Sánchez](#), IFIMAC researcher and member of Department of Theoretical Condensed Matter Physics.

The density of states of proximitized normal nanowires interrupting superconducting rings can be tuned by the magnetic flux piercing the loop. Using these as the contacts of a single-electron transistor allows us to control the energetic mirror asymmetry of the conductor, thus introducing rectification properties. In particular, we show that the system works as a diode that rectifies both charge and heat currents and whose polarity can be reversed by the magnetic field and a gate voltage. We emphasize the role of dissipation at the island. The coupling to substrate phonons enhances the effect and furthermore introduces a channel for phase tunable conversion of heat exchanged with the environment into electrical current.

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