Abstract Submitted
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Ground state cooling of a nanomechanical resonator using electron transport in hybrid systems.[1] GIANLUCA RASTELLI, PASCAL STADLER, WOLFGANG BELZIG, University of Konstanz — A still open challenge in nanoelectromechanical systems is the achievement of the quantum regime via active cooling and using electron transport. I will discuss active ground state cooling in a bottom-up device, viz. a carbon nanotube quantum dot suspended between two electric nano-contacts, and for two different coherent transport regimes: (i) spin-polarized current between two ferromagnets and (ii) sub-gap Andreev current between a superconductor and a normal metal. I will show that efficient ground state cooling of the resonator can be achieved for realistic parameters of the system and varying the transport parameters, e.g. gate voltage, magnetic field, etc. Finally I will discuss the signatures in the current-voltage characteristics of the non-equilibrium state of the nanoresonator.

[1]Zukunftskolleg of the University of Konstanz; DFG through SFB 767 and BE 3803/5.

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