tance $R_{\rm dc} = R_{\rm beam} + R_0$=794 Ω, bias and cable capacitances C_0 = 54 nF and C_1 = 70 pF were measured using an impedance analyser at 1.26 MHz. Terminals T3 and T4 are grounded. A 1 MΩ input impedance voltage buffer amplifier is used to minimize the effects of cables and spectrum analyser on the engine operation. In Fig. 3b DC resistive heating can lead to a temperature increase of the beam which opposes the refrigeration mechanism. It is estimated from the temperature dependence of the resistance and from FEM simulations that the maximum temperature of the engine beam is 370±20 K at I_{dc} = 3 mA (see Supplementary Fig. C). This temperature increase of 17% by DC resistive heating is relatively small compared to the factor 5 decrease in $T_{\rm eff}$ as a result of the reduction of $Q_{\rm eff}$.

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