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Superconducting-circuit quantum heat engine with frequency resolved thermal baths PATRICK P. HOFER, JEAN-RENÉ SOUQUET, AASHISH A. CLERK, McGill University — The study of quantum heat engines promises to unravel deep, fundamental concepts in quantum thermodynamics. With this in mind, we propose a novel, realistic device that efficiently converts heat into work while maintaining reasonably large output powers. The key concept in our proposal is a highly peaked spectral density in both the thermal baths as well as the working fluid. This allows for a complete separation of the heat current from the working fluid. In our setup, Cooper pairs tunnelling across a Josephson junction serve as the the working fluid, while two resonant cavities coupled to the junction act as frequency-resolved thermal baths. The device is operated such that a heat flux carried entirely by the photons induces an electrical current against a voltage bias, providing work.

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