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Molecular heat pump DVIRA SEGAL, Department of Chemical Physics Weizmann Institute of Science Rehovot 76100 Israel, ABRAHAM NITZAN COLLABORATION — A heat pump is a device that transfers heat from a low to a high temperature reservoir by applying an external work that modulates the system's parameters. In this work we discuss a novel molecular machine of this kind. The system consists of a molecular element connecting two thermal reservoirs that are characterized by different spectral properties. The pumping action is achieved by applying an external force that periodically modulates molecular levels. This modulation affects periodic oscillations of the internal temperature of the molecule and the strength of its coupling to each reservoir resulting in a net heat flow in the desired direction. The heat flow is examined in the slow and fast modulation limits and for different modulation waveforms, thus making it possible to optimize the device performance.

Dvira Segal
Department of Chemical Physics, Weizmann Institute of Science
Rehovot 76100 Israel

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