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Realization of an information ratchet under real time feedback control GOVIND PANERU, Center for Soft and Living Matter, Institute for Basic Science (IBS), Ulsan 44919, Republic of Korea, DONG YUN LEE, Department of Structure and Constituents of Matter, University of Barcelona, Barcelona 08028, Spain, HYUK KYU PAK, IBS Center for Soft and Living Matter, and Ulsan National Institute of Science and Technology (UNIST), Ulsan 44919, Republic of Korea — We have designed an information ratchet that is capable of transporting a Brownian particle in one direction and extracting work from a single heat bath by utilizing the information about the microscopic state of the system. The feedback control system is capable of performing an error-free measurements with a precision of 2 nm or less. By taking account of the unavailable information, we have demonstrated that the system achieves an upper bound of extractable work and thereby validates the generalized second law of thermodynamics. We have also confirmed the generalized Jarzyski equality for the case of error-free measurements.

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