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Directionally controlled switching of a molecular rotor HEATH KERSELL, U.G.E. PERERA, Nanoscale and Quantum Phenomena Institute (NQPI), Physics and Astronomy Dept., Ohio University, F. AMPLE, IMRE, A*STAR, Y. ZHANG, NQPI, Physics and Astronomy Dept., Ohio University, G. VIVES, J. ECHEVERRIA, M. GRISOLIA, G. RAPENNE, C. JOACHIM, GNS & MANA Satellite, CEMES, CNRS, S.-W. HLA, NQPI, Physics and Astronomy Dept., Ohio University, NQPI, PHYSICS AND ASTRONOMY DEPT., OHIO UNIVERSITY TEAM, GNS & MANA SATELLITE, CEMES, CNRS TEAM, UNIVERSIT DE TOULOUSE, UPS TEAM, IMRE, A*STAR TEAM — Directional control in the operation of molecular devices is a key hurdle in the path toward functional synthetic devices at the nanoscale. We demonstrate the operation of a molecular rotor whose rotator is decoupled from substrate interactions via a threefold symmetric stator with a single ruthenium atom at its apex, acting as a bearing around which the rotator is controlled. Five "arms" extend from the apex of the stator, one of which is truncated to facilitate observation of device rotations via molecular asymmetry. Molecular rotations are driven via inelastic tunneling electrons from the tip of a scanning tunneling microscope, and the direction of rotation is determined by the choice of electron injection site with respect to the internal molecular structure.

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