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**Heat engine by exorcism of Maxwell Demon using spin angular momentum reservoir** SALIL BEDKIHAL, JACKSON WRIGHT, JOAN VACCARO, Centre for quantum dynamics, Griffith University, Brisbane, Australia, TIM GOULD, Queensland Micro- and Nanotechnology Centre, Griffith University — Landauer’s erasure principle is a hallmark in thermodynamics and information theory. According to this principle, erasing one bit of information incurs a minimum energy cost. Recently, Vaccaro and Barnett (VB) have explored the role of multiple conserved quantities in memory erasure. They further illustrated that for the energy degenerate spin reservoirs, the cost of erasure can be solely in terms of spin angular momentum and no energy. Motivated by the VB erasure, in this work we propose a novel optical heat engine that operates under a single thermal reservoir and a spin angular momentum reservoir. The novel heat engine exploits ultrafast processes of phonon absorption to convert thermal phonon energy to coherent light. The entropy generated in this process then corresponds to a mixture of spin up and spin down populations of energy degenerate electronic ground states which acts as demon’s memory. This information is then erased using a polarised spin reservoir that acts as an entropy sink. The proposed heat engines goes beyond the traditional Carnot engine.

Salil Bedkihal  
Centre for quantum dynamics, Griffith University, Brisbane, Australia

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