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A simple Quantum heat engine operating between two negative temperatures[1] TOLASA A DIMA, PhD Student , MULUGETA BEKELE, Associate Professor of Physics — We study a heat engine that operates between two reservoirs at negative temperatures. A system of spin-half particles, in the thermodynamic limit, subject to a time dependent external magnetic field, is used as a working substance because of its capability to demonstrate negative absolute temperature. We explored the finite-time quantities: period, power and efficiency. The engine is explored in its maximum power and optimum mode of operation from which its figure of merit is defined as the product of scaled power and scaled efficiency. We found that power-wise the engine provides better performance under its maximum power mode of operation than the optimized mode; however, efficiency-wise, the optimized mode of operation is better than its maximum mode operation.

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