Simulating different entropic functionals from a two-level quantum system

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We have created a protocol to simulate different thermostatistics from a two-level quantum system. We assume that the thermal noise can be neglected, in order that we can work at zero temperature ($T=0$). We have established the way that the two-level Hamiltonian must present so that we can introduce an effective temperature θ and its parameter conjugated associated, the entropy S. By proposing an infinitesimal form for the first law thermodynamics, we introduces an heat- and work-like quantities. As examples, we apply our protocol to the Boltzmann-Gibbs (BG) and Tsallis thermostatistics. From a similar strategy to Clasuius theorem, we see that the entropy associated with these cases exactly matches the BG and Tsallis entropies. In all cases, it is easy to see that the form for the efficiency of the proposed Carnot Cycle is invariant.