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Unreal perpetual motion machine, Rydberg constant and Carnot non-unitary efficiency as a consequence of the atomic irreversibility. (English) Zbl 07546868


Summary: A perpetual motion machine is a completely ideal engine which cannot be realized. Carnot introduced the concept of the ideal engine which operates on a completely reversible cycle, without any dissipation, but with an upper limit in it. So, even in ideal condition without any dissipation, there is something that prevents the conversion of all the energy absorbed by an ideal reservoir into work. But what is the cause of irreversibility? Here we highlight the atomic nature of this irreversibility, proving that it is no more than the continuous interaction of the atoms with the surrounding field. The macroscopic irreversibility is the consequence of the microscopic irreversibility.

MSC:
82-XX Statistical mechanics, structure of matter

Keywords:
irreversible hydrogen-like atoms; Loschmidt-Boltzmann paradox; perpetual motion; Rydberg’s constant; Carnot efficiency; quantum thermodynamics

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