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Hawking Radiation: A Violation of the Zeroth Law of Thermodynamics. PIERRE-MARIE ROBITAILLE, Ohio State Univ - Columbus — According to modern theory, Hawking Radiation can be emitted from a non-rotating, non-charged Schwarzschild black hole. This radiation is thought to be a manifestation of a real thermodynamic process. The resulting temperature has always been viewed as a physical temperature in accordance with the zeroth law. However, it is readily apparent that the concept of a Hawking Temperature violates the zeroth law of thermodynamics. Hawking Radiation is said to correspond to a blackbody spectrum at a temperature, $T_H = \hbar c^3/(8\pi GMk_B)$, where $\hbar$, c, π, G, and k_B are well-known constants and M corresponds to the mass of the black hole. However, temperature is an intensive property. It cannot be made to depend on the mass of a system, an extensive property, without an associated extensive property, like volume, which in combination with M leads to an intensive property. If the left side of an equation is intensive in thermodynamics, then the right side must also be intensive. The equation for Hawking Temperature violates this rule. Furthermore, the production of a blackbody spectrum absolutely depends on the presence of a physical lattice as is well-known throughout metrology. The idea that such a spectrum can be generated from thermal equilibrium considerations alone is false.[1] The point is made by considering perfectly reflecting cavities which are unable to emit any photons. As a result, black holes cannot be reconciled with the known laws of thermodynamics and Hawking Radiation does not exist. [1]Robitaille P.-M., IEEE Trans. Plasma Sci., 2003, v. 31(6), 1263-1267.

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