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Hawking-Bekenstein temperature and entropy from uncertainty principle

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We give an alternative way for deducing the Hawking-Bekenstein black hole temperature and entropy by using the Heisenberg uncertainty principle. We consider as known the black hole mass as M and consequently its energy. Quantities as temperature T and entropy S can be found under the hypothesis that incoming radiation and matter leads to a thermodynamic equilibrium state. Obviously this is not seen by an external observer, who may know only the horizon temperature T'. The results are obtained theoretically, by using the convergence of general relativity, thermodynamics and quantum mechanics. We start by assuming small black holes, although the resulting equations have a more general validity. It can be shown that reciprocally, starting from the Hawking-Bekenstein temperature, uncertainty relation equations can be obtained. Examples are given for small and large blackhole masses.

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