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Near-horizon aspects of acceleration radiation by free fall of an atom into a black hole[1] ABHIJIT CHAKRABORTY, CARLOS ORDONEZ, University of Houston, HORACIO CAMBLONG, University of San Francisco — A cloud of two-level atoms falling freely into a Schwarzschild black hole was recently shown to detect radiation in the Boulware vacuum using a quantum optics approach. In this model, the atoms interact with a mode of the scalar field via a dipole interaction. The relative acceleration between the field and the atom causes it to detect the radiation. The detected radiation has a thermal spectrum with a Planck factor which depends upon the frequency of the field mode. In this talk we show that the probability of detecting radiation is dominated by the conformal aspects of the near-horizon physics. The results indicate the relation of the near-horizon conformal quantum mechanics (CQM) with the spectrum of the detected thermal radiation with Hawking temperature and reinforces its relevance to all other thermodynamic properties of the black hole. Additionally, this insight about the effect of the near-horizon CQM enables us to tackle the same problem for a variety of spacetime backgrounds and general initial conditions.

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