

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Plume shot noise in convection: evidence of a boundary layer instability consistent with the triggering of the Ultimate regime of convection JULIEN SALORT, Institut NEEL, CNRS — A sudden enhancement of the heat transfer for Rayleigh numbers $Ra > 1e12$ was reported in a Rayleigh Bénard cell in 1997 (Chavanne et al. PRL). This observation was interpreted as the occurrence of Kraichnan's "Ultimate" regime of convection, which is characterized by turbulent boundary layers. This interpretation has been indirectly supported by the outcome of a test experiment, using a cell with corrugated surfaces. A more direct test would consist in probing fluctuations within the boundary layer, but its thinness (order 100 microns) causes instrumentation challenges. To overcome this difficulty, we recorded the shot noise induced by the thermal plumes leaving the bottom plate. We find that the heat transfer enhancement at $Ra \sim 1e12$, is accompanied by a significant increase of shot noise. This observation is interpreted as the signature of a boundary layer instability, in agreement with the Ultimate regime scenario. [Gauthier F. and Roche P.-E et al., EPL 83:24005 (2008)]

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Date submitted: 03 Sep 2008

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