Abstract Submitted
for the APR13 Meeting of
The American Physical Society

AdS flowing black funnels: Stationary AdS black holes with non-Killing horizons and heat transport in the dual CFT[1] SEBASTIAN FISCHETTI, DONALD MAROLF, JORGE SANTOS, University of California, Santa Barbara — We construct stationary non-equilibrium black funnels locally asymptotic to global AdS_4 in vacuum Einstein-Hilbert gravity with negative cosmological constant. These are non-compactly-generated black holes in which a single connected bulk horizon extends to meet the conformal boundary. Thus the induced (conformal) boundary metric has smooth horizons as well. In our examples, the boundary spacetime contains a pair of black holes connected through the bulk by a tubular bulk horizon. Taking one boundary black hole to be hotter than the other ($\Delta T \neq 0$) prohibits equilibrium. The result is a so-called flowing funnel, a stationary bulk black hole with a non-Killing horizon that may be said to transport heat toward the cooler boundary black hole. While most of our results are numerical, a semi-analytic fluid/gravity description can be obtained by passing to a one-parameter generalization of the above boundary conditions. In the fluid regime, we find excellent agreement with our numerical solutions. In terms of a dual CFT, our solutions describe heat transport via a large N version of Hawking radiation through a deconfined plasma that couples efficiently to both boundary black holes.

[1]Supported in part by the NSF under Grant Nos PHY11-25915 and PHY08-55415 and by funds from the University of California. DM thanks the University of Colorado, Boulder, for its hospitality during the completion of this work.

Sebastian Fischetti
University of California, Santa Barbara

Date submitted: 09 Jan 2013 Electronic form version 1.4