Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Macroscopic Effects of the Quantum Trace Anomaly EMIL MOTTOLA, Los Alamos National Laboratory, RUSLAN VAULIN, University of Wisconsin at Milwaukee — The low energy effective action of gravity in any even dimension generally acquires non-local terms associated with the trace anomaly, generated by the quantum fluctuations of massless fields. The local auxiliary field description of this effective action in four dimensions requires two additional scalar fields, not contained in classical general relativity, which remain relevant at macroscopic distance scales. The auxiliary scalar fields depend upon boundary conditions for their complete specification, and therefore carry global information about the geometry and macroscopic quantum state of the gravitational field. The scalar potentials also provide coordinate invariant order parameters describing the conformal behavior and divergences of the stress tensor on event horizons.

Emil Mottola
Los Alamos National Laboratory

Date submitted: 16 Jan 2007 Electronic form version 1.4