ON THE ENTROPY OF A SPHERICAL PLASMA SHELL

M. BORDAG AND K. KIRSTEN

ABSTRACT. Negative entropy was repeatedly observed in the Casimir effect caused by dissipation or geometry. However, it was restricted to subsystems. Recently the question about the entropy for a complete Casimir effect like configuration was raised. In the present paper we consider a spherical plasma shell which can be considered as a (crude) model for a giant carbon molecule (e.g., C_{60}). The entropy is free of ultraviolet divergences and its calculation does not need any regularization. We calculate the entropy numerically and demonstrate unambiguously the existence of a region where it takes negative values. This region is at small values of temperature and plasma frequency (in units of the radius).

UNIVERSITÄT LEIPZIG, INSTITUTE FOR THEORETICAL PHYSICS, POSTFACH 100920, 04009 LEIPZIG, GERMANY
E-mail address: Michael.Bordag@uni-leipzig.de

DEPARTMENT OF MATHEMATICS, BAYLOR UNIVERSITY, WACO, TX 76798, USA
E-mail address: Klaus_Kirsten@baylor.edu

1