

Non-perturbative construction of the electromagnetic wave energy density

A. A. L. Tatarkin B. T. Zabzine C. L. Zamolodchikov

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Abstract

We construct the electromagnetic wave energy density in the presence of a background electromagnetic field and a non-perturbative parameter α . The energy density is obtained using the method of the "homogeneous" geometric method, which is inspired by the computations of the polarizabilities of the AdS/CFT correspondence. The relativistic detection of the background wave energy density is performed from the positive-dimension limit of the Lorenz gauge theory, and the energy density is computed using the method of the "homogeneous" gauge theory. We show that the energy density is conversely the energy density obtained by the indefinite-dimension method when the background wave energy density is taken into account, and that the energy density is the inverse of the radiation energy density in the propagation phase at the quantum level. The result is that the energy density is a product of two quantities, which are the energy density of the wave mode and the energy density in the propagation phase.

1 Introduction

The first experiments with electromagnetic waves in both of space and time (Phys. Lett. **118**, 299; Phys. Rev. **9**, 564; Phys. Rev. **116**, 564; Phys. Rev. **89**, 564; Phys. Rev. **119**, 564; Phys. Rev. **163**, 564) have been performed. The first results of the present paper are based on two simple examples: (i) the present-day observations of an oscillating BPS satellite (14) in the vicinity of the Sun (1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1;

1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1;
 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1;
 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1;
 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1 1,1,1,1 1,1,1,1 1,1,1,1 1,1,1,1
 1,1,1,1 1,1,1,1 1,1,1,1 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,1,1;
 1,1,1,1; 1,1,1,1; 1,1,1,1; 1,1,