

A SEMIGROUP-BASED TENSOR FORMULATION FROM THE FOCK STATE OF A PHOTON GAS IN A ONE-DIMENSIONAL RESONANT CAVITY

M. A. Grado-Caffaro and M. Grado-Caffaro

Received April 30, 2016

Abstract

Given that the photon is the fundamental quantum of electromagnetic field, by starting from the fact that the quantum state of the electromagnetic field may be expressed as a Fock state and for a photon gas confined into a one-dimensional resonant cavity at quasi-zero absolute temperature, we extract and characterize an algebraic semigroup such that the photon-number operator in the Fock state is the tensorial product of the one-element orbits of this semigroup over the space of photon-number states. In addition, the operator product of the Hamiltonian and photon-number operators is determined and the expectation values of these operators are calculated

Keywords and phrases: Fock state, photons, resonant cavity, algebraic semigroup, tensorial product, photon-number operator.

ISSN: 2277-8799

Pioneer Journal of Mathematical Physics and its Applications

