

Electron rest mass and line spectrum of atoms in the photonic crystal medium

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Abstract

We study a recently predicted novel-type quantum electrodynamical effect that takes place in the photonic crystal medium. It consists in the fact that the modification of the interaction of a charged particle with its own radiation field in the photonic crystal medium results in the change in its mass. Consequences and possible applications of this effect are discussed. It is shown that, as a consequence of the effect, spectrum of the light emitted by atoms may be profoundly modified if, instead of being in free space, atoms are enclosed in air voids of a photonic crystal. Spectral lines of atoms in the photonic crystal medium are shifted in frequency, and this shift may be comparable to the atomic transition frequencies in free space. © Published under licence by IOP Publishing Ltd.

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