OPERATOR OF PHOTON DENSITY
IN THE PHASE SPACE

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S u m m a r y

The possibility to describe the evolution of an electromagnetic field by means of the photon distribution function in the phase space ($\mathbf{r}, \mathbf{q}$-space) is studied. This function defined by analogy with the coarse-grained Mandel operator of photon density in the configuration space is used to characterize the local density of photons with a given momentum. Approximate eigenfunctions and eigenvalues of the distribution function, corresponding to one-photon localized states of the electromagnetic field, are obtained. It is shown that the photon transport is governed by the Newton mechanics if the "external force" acting on photons is a slowly varying function of spatial variables. It is shown that the distribution function at any time can be expressed via the initial distribution and photon's trajectories.