

Correlation between momenta of two atoms deflected from an off-resonant quantized standing-wave light field

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Abstract: It is shown that the correlation between momenta of two atoms cooperatively deflected from an off-resonant quantized standing-wave light field arises due to the fluctuations of the field in the photon number. The normalized cross-correlation functions are calculated. The Cauchy-Schwartz-type inequalities for the joint distribution of the atomic transverse momenta are derived. The simultaneous deflection of the atoms allows one to determine the mean photon number and the width of the photon distribution and to produce predetermined correlations between atomic de Broglie waves.

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