

Quantum Refractors

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Abstract

In this note the authors propose an extended version of quantum illumination to enhance the resolution of optical refractive telescopes.

Consider starlight impinging on a telescope objective. Suppose a high quality nonlinear crystal such as BBO or KTP is used in the objective. The impinging photons will produce a signal and an idler, entangled with one another. In the nominal case, the signal is used to travel to the eyepiece and therefrom to the photographic plate. The idler is measured. Since the idler properties are correlated with those of the signal, by accordingly adjusting the exposure time, the polarization filter and other parameters before photographic plate impact, one can maximize the quality of the signal's reception on the plate. In this way the telescope's sensitivity can be enhanced quantum mechanically.