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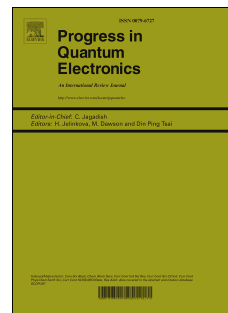
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Dressed Photons in a New Paradigm of Off-shell Quantum Fields

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Abstract

This article reviews recent progress in theoretical studies of dressed photons. For providing concrete physical images of dressed photons, several experimental studies are demonstrated. They are applications of dressed photons to novel optical functional devices, nano-fabrication technologies, energy conversion technologies, and photon breeding devices. After these experimental demonstrations, as the main part of this review, quantum-field theoretical formulation of dressed photons is attempted in use of the newly introduced Clebsch-dual variable of electromagnetic field. The reason for introducing the new formulation will be explained in the final section from the viewpoint to exhibit the contrast between free and interacting quantum fields in regard to their energy-momentum supports which are seldom touched upon (or forgotten) in the common physical

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