The analogy between optical beam shifts and quantum weak measurements

Mark R Dennis, Jörg B Götte

(Submitted on 2 Apr 2012)

We describe how the notion of optical beam shifts (including the spatial and angular Goos-H\"anchen shift and Imbert-Federov shift) can be understood as a classical analogue of a quantum measurement of the polarization state of a paraxial beam by its transverse amplitude distribution. Under this scheme, complex quantum weak values are interpreted as spatial and angular shifts of polarized scalar components of the reflected beam. This connection leads us to predict an extra spatial shift for beams with a radially-varying phase dependence.

Comments:	14 pages, 2 figures. IoP style
Subjects:	**Optics (physics.optics)**; Quantum Physics (quant-ph)
Journal reference:	New Journal of Physics 14, 073013 (2012)
DOI:	10.1088/1367-2630/14/7/073013
Cite as:	**arXiv:1204.0327 [physics.optics]**
	(or **arXiv:1204.0327v1 [physics.optics]** for this version)

Submission history

From: Mark Dennis [view email]
[v1] Mon, 2 Apr 2012 07:14:04 GMT (370kb,D)

Which authors of this paper are endorsers?