

Abstract Submitted
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Large violation of Bell's inequalities using both counting and homodyne measurements VALERIO SCARANI, DANIEL CAVALCANTI, CQT, National University of Singapore, NICOLAS BRUNNER, PAUL SKRZYPCZYK, University of Bristol, ALEJO SALLES, Bohr Institute, Copenhagen — So far, all the optical demonstrations of violations of Bell's inequalities have involved discrete degrees of freedom (e.g. polarization, time-bins) and are plagued by the detection-efficiency loophole. Continuous degrees of freedom would be a very interesting alternative because of the efficiency of the homodyne measurement; but the feasible schemes proposed so far reach very weak violations. We show that large violations for easily-prepared states can be achieved if both photon counting and homodyne detections are used. Our simple scheme may lead to the first violation of Bell's inequalities with continuous variables and pave the way for a loophole-free Bell test.

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