Entanglement Control as Quantum Information Resource

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Entanglement is a key resource for quantum technologies ranging from computing through communication to sensing. A unitary entanglement mechanism, based on giant long-range dipole-dipole interactions (DDI), has recently been demonstrated to result in single-polariton entanglement [1]. This mechanism opens the road to novel quantum thermodynamic and sensing applications [2,3]. Another major development concerns DDI-coupled spin networks whose entanglement is subject to symmetry constraints [4] and disorder [5].

Notwithstanding the promise of these trends, the generation of unitary entanglement at the few-quanta level remains challenging. A straightforward substitute is based on conditional measurements (post-selection) of multipartite states [6] but it incurs infidelity. A novel alternative we propose is based on linear stroboscopic phase control that can amplify two-mode photonic entanglement to a giant degree [7].

References

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