



Contribution ID: 125

Type: Oral (Non-Student) / orale (non-étudiant)

Sustainable entanglement farming in quantum optics and beyond

Friday 20 June 2014 10:00 (15 minutes)

We discuss how it is possible to build low-maintenance, sustainable entanglement sources taking advantage of the build-up of relativistic effects even in non-relativistic settings in a reliable and experimentally low-demanding way. We will discuss that in certain generic circumstances the state of light of an optical cavity traversed by beams of atoms is naturally driven towards a non-thermal metastable state. This state can be such that successive pairs of unentangled particles sent through the cavity will reliably emerge significantly entangled thus providing a renewable source of quantum entanglement. This entangling fixed point state of the cavity can be reached largely independently of the initial state in which the cavity was prepared, suggesting that reliable entanglement farming on the basis of such a fixed point state should be possible also in various other experimental settings, namely with the to-be-entangled particles replaced by arbitrary qudits and with the cavity replaced by a suitable reservoir system.

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Session Classification: (F1-6) Atomic, Molecular and Optical Physics - DAMOPC / Physique atomique, moléculaire et photonique - DPAMPC

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)