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Entanglement transfer from microwaves to diamond NV centers[1]
ANGELA V. GOMEZ, FERNEY J. RODRIGUEZ, LUIS QUIROGA, Universidad de los Andes — Strong candidates to create quantum entangled states in solid-state environments are the nitrogen-vacancy (NV) defect centers in diamond. By the combination of radiation from different wavelength (optical, microwave and radio-frequency), several protocols have been proposed to create entangled states of different NVs. Recently, experimental sources of non-classical microwave radiation have been successfully realized. Here, we consider the entanglement transfer from spatially separated two-mode microwave squeezed (entangled) photons to a pair of NV centers by exploiting the fact that the spin triplet ground state of a NV has a natural splitting with a frequency on the order of GHz (microwave range). We first demonstrate that the transfer process in the simplest case of a single pair of spatially separated NVs is feasible. Moreover, we proceed to extend the previous results to more realistic scenarios where ^{13}C nuclear spin baths surrounding each NV are included, quantifying the degradation of the entanglement transfer by the dephasing/dissipation effects produced by the nuclear baths. Finally, we address the issue of assessing the possibility of entanglement transfer from the squeezed microwave light to two nuclear spins closely linked to different NV center electrons.

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