

Abstract Submitted
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Phase-Covariant Cloning and EPR Correlations in Entangled Macroscopic Quantum Systems FRANCESCO DE MARTINI, FABIO SCIARINO, Universita di Roma - La Sapienza — Theoretical and experimental results on the Quantum Injected Optical Parametric Amplification (QI-OPA) of optical qubits in the high gain regime are reported. The large size of the gain parameter in the collinear configuration, $g = 4.5$, allows the generation of EPR nonlocally correlated bunches containing about 4000 photons. The entanglement of the related Schroedinger Cat-State (SCS) is demonstrated as well as the establishment of Phase-Covariant quantum cloning. The cloning “fidelity” has been found to match the theoretical results. According to the original 1935 definition of the SCS, the overall apparatus establishes for the first time the nonlocal correlations between a microscopic spin (qubit) and a high J angular momentum i.e. a mesoscopic multiparticle system close to the classical limit. The results of the first experimental realization of the Herbert proposal for superluminal communication via nonlocality will be presented.

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