irfu institut de recherche sur les lois fondamentales de l'Univers saclay

Séminaire SPP

Lundi 24 janvier 11h00

CEA-Saclay Bât 141, salle André Berthelot

Violation of a Bell inequality in time with weak measurement

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IRAMIS/SPEC - CEA Saclay

In 1985, A. Leggett and A. Garg have derived an inequality that can be regarded as a Bell inequality in time for a classical degree of freedom measured at different times. This inequality, which can be violated by a quantum system only, was adapted by R. Ruskov and coworkers to the situation where a quantum two level system (TLS) is continuously and weakly measured during its coherent oscillations. In this work we report the first experimental test of this inequality on a TLS made of a superconducting quantum circuit, the transmon, whose state is continuously and weakly measured while driving continuously its Rabi oscillations. The autocorrelation function of the measured signal is in agreement with simple quantum-mechanical predictions and in contradiction with any macrorealistic model, thus proving the genuine quantumness of the circuit.

Le café sera servi 10 minutes avant.

NB : La présentation d'une pièce d'identité est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance Emilie Chancrin, tél. 01 69 08 23 50, e-mail : `emilie.chancrin@cea.fr`. (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).