

COLOQUIO
Departamentos de Física Teórica I y II
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TITULO: TIME REVERSAL VIOLATION FOR ENTANGLED NEUTRAL MESONS

LUGAR: FACULTAD DE CIENCIAS FÍSICAS UCM

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HORA: 14:30

AULA: Sala de Grados, Planta 1ª

ABSTRACT

A direct evidence for Time Reversal Violation(TRV) means an experiment that, considered by itself, clearly shows TRV independent of, and unconnected to, the results for CP Violation. No existing result before the recent BABAR experiment with entangled neutral B mesons had demonstrated TRV in this sense.

There is a unique opportunity for a search of TRV with unstable particles thanks to the Einstein-Podolsky-Rosen(EPR) Entanglement between the two neutral mesons in B, and PHI, Factories. The two quantum effects of the first decay as a filtering measurement and the transfer of information to the still living partner allow to perform a genuine TRV asymmetry with the exchange of "in" and "out" states.

With four independent TRV asymmetries, BABAR observes a large deviation of T-invariance at 14 sigma level, far more than needed to declare the result as a discovery. This is the first direct observation of TRV in the time evolution of any system.