



SPEAKER: Fernando Martinez-Vidal (IFIC, Universitat de Valencia-CSIC)

TITLE: **Observation of the weak time's arrow in B mesons**

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ABSTRACT

The mechanism of CP violation in weak interactions, as arising from the single physical phase in the CKM matrix, has been validated by more than a decade of intense experimental work probing CP violation, particularly with studies with B mesons. Since the Standard Model theory is CPT invariant, it predicts a “weak arrow of time” matching the large observed matter-antimatter asymmetry in B mesons. However, until recently there has been no direct observation of the expected, large time reversal (T) asymmetry. In this seminar we shall discuss how the BABAR experiment at SLAC has conducted a new data analysis where the decays of entangled neutral B mesons allow comparisons between the rates of four different transitions and their inverse, as a function of the time evolution of the B meson. The results lead to the first high significance, direct observation of T non-invariance through the exchange of initial and final states in transitions that can only be connected by a T symmetry transformation.