



Contribution ID: 24

Type: **Invited**

Direct observation of time-reversal violation in B_0 decays

Tuesday, 5 March 2013 10:20 (1 hour)

The B factories have established with great accuracy the violation of the CP symmetry in the B system. However, no direct observation of time-reversal violation had been performed prior to the work, recently published by the BABAR Collaboration, discussed in the present talk. The quantum entanglement of B - \bar{B} pairs produced in the decay of the $Y(4S)$ resonance at the PEP-II asymmetric B Factory is exploited to perform an unambiguous t -transformation (inversion of the sign of t and exchange of the "in" and "out" states). The comparison of the decay rates of reference and t -transformed states as a function of the decay time difference allows us to establish for the first time T violation in the B system with a significance of 14 sigma, independently from assumptions on the CPT symmetry.

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Session Classification: Evolution of Time