

# A direct test of T symmetry in the neutral K meson system with $K_S K_L \rightarrow \pi^\pm l^\mp \nu_l 3\pi^0$ at the KLOE-2 experiment

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## Collaboration

KLOE-2

## Abstract content

Quantum entanglement of K and B mesons allows for a direct experimental test of time-reversal symmetry independent of CP violation. The T symmetry can be probed by exchange of initial and final states in the reversible transitions between flavor and CP-definite states of the mesons which are only connected by the T conjugation. While such a test was successfully performed by the BaBar experiment with neutral B mesons, the KLOE-2 detector can probe T-violation in the neutral kaons system by investigating the process with  $K_S \rightarrow \pi^\pm l^\mp \nu_l$  and  $K_L \rightarrow 3\pi^0$  decays. Analysis of the latter is facilitated by a novel reconstruction method for the vertex of  $K_L \rightarrow 3\pi^0$  decay which only involves neutral particles. Details of this new vertex reconstruction technique will be presented as well as prospects for conducting the direct T symmetry test at the KLOE-2 experiment.

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