

Search for the $K_S \rightarrow 3\pi^0$ decay with the KLOE detection setup

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The $K_S \rightarrow 3\pi^0$ decay is a pure CP violating process which, assuming CPT invariance, allows one to investigate direct CP violation. This decay hasn't been observed so far, and the best upper limit on the branching ratio $BR(K_S \rightarrow 3\pi^0) < 1.2 \cdot 10^{-7}$ is two orders of magnitude larger than predictions based on the Standard Model. In this talk we present the search for the $K_S \rightarrow 3\pi^0$ decay performed with the KLOE detection system operating at the DAΦNE ϕ -factory at the Frascati Laboratory of the Italian Institute of Nuclear Physics. We describe the experimental techniques used in the background rejection and signal events selection as well as the evaluation of the five times lower upper limit on the $K_S \rightarrow 3\pi^0$ branching ratio. We discuss shortly also the perspectives for a new measurement using the KLOE-2 apparatus equipped with a new inner tracker and the calorimeters at low θ angle.

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