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# Determination of an Upper Limit for the Mass of the $\tau$–Neutrino at LEP

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Abstract

An upper limit for the $\nu_\tau$ mass is determined through the kinematic reconstruction of the decay $\tau \to 5\pi^\pm\nu_\tau$ in the OPAL detector at LEP. The limit is obtained using a new method based on the comparison of the two–dimensional distribution of energy and invariant mass of the five–pion system with expectations from different neutrino mass hypotheses. From a sample of five events surviving the selection criteria we obtain an upper limit of 74 MeV at 95% confidence level. It is the first measurement at LEP energies, where the larger average multiplicity of $e^+e^- \to q\overline{q}$ events makes the suppression of this background more robust compared to lower energies.

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