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Tau leptonic branching ratios and lifetime

The ALEPH Collaboration*

A sample of 62249 τ -pair events is selected from data taken with the ALEPH detector in 1991, 1992 and 1993. The measurement of the branching fractions for τ decays into electrons and muons is presented with emphasis on the study and the reduction of systematic effects from selection, particle identification and decay classification. The results obtained are : $B_e = 17.76 \pm 0.11(stat) \pm 0.07(syst)(\%)$ and $B_\mu = 17.31 \pm 0.11(stat) \pm 0.07(syst)(\%)$. Using data up to 1992 the tau lifetime is measured to be $\tau_\tau = 292.5 \pm 2.7 \pm 1.7 (fs)$. When combined, these results provide a relative measurement of the leptonic couplings in the weak charged current for transverse W bosons : $\frac{g_\mu}{g_e} = 1.0011 \pm 0.0052$ and $\frac{g_\tau}{g_{e,\mu}} = 0.9963 \pm 0.0059$. Universality of the leptonic couplings thus holds at the 6‰ level¹.

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¹M. Davier, Proceedings of the third Workshop on Tau Lepton Physics, Montreux 1994, L. Rolandi ed., *Nucl. Phys. (Proc. Suppl.)* **B40** (1995) .