D MESONS

Revised January 2000 by P.R. Burchat (Stanford University).

The new experimental results on D mesons reported in this edition are mostly from the CLEO-II experiment at the CESR e^+e^- storage ring and from the fixed-target experiment E791 at Fermilab. The CLEO experiment has measured the D^+, D^0, and D_s^+ lifetimes, and E791 has measured the D^0 and D_s^+ lifetimes. The measured ratio of D_s^+ to D^0 lifetimes is now significantly greater than unity: $\tau(D_s^+)/\tau(D^0) = 1.20 \pm 0.02$.

The E791 experiment has obtained the first directly measured limit on the decay-width difference $\Delta\Gamma$ for the mass eigenstates of the neutral D system, looking for a difference in decay rates between the CP-even decay $D^0 \to K^+K^-$ and the CP-mixed decay $D^0 \to K^-\pi^+$. The CERN experiment ALEPH and CLEO have made new searches for neutral D mixing in the "wrong-sign" decay $D^0 \to K^+\pi^-$; no evidence for mixing has been found. CLEO has reduced the uncertainty on the measurement of the doubly Cabibbo-suppressed decay rate $\Gamma(D^0 \to K^+\pi^-)$ by about a factor of three.

The CERN experiment BEATRICE has measured form factors for the semileptonic decay $D^+ \to \overline{K}^*(892)^0\ell^+\nu_\ell$, and E791 has measured form factors both for this decay and for $D_s^+ \to \phi\ell^+\nu_\ell$. The CERN experiment OPAL has measured the semileptonic branching fraction for charm hadrons produced in $Z \to c\bar{c}$. The Fermilab experiment CDF has set limits on semileptonic decay rates involving K resonances above the $K^*(892)$. The BEPC experiment BES has observed one $D^+ \to \mu^+\nu_\mu$ event, and CLEO has improved a measurement of the D_s^+ leptonic decay constant.

CLEO has now measured the important $D^0 \to K^-\pi^+$ branching fraction using three different methods, and has also measured D^+ and D_s^+ branching fractions involving η and η' mesons. An E791 search for 24 rare or forbidden decays to dilepton final states yielded no evidence for new physics.