$c\bar{c}$ Region in e^+e^- Collisions

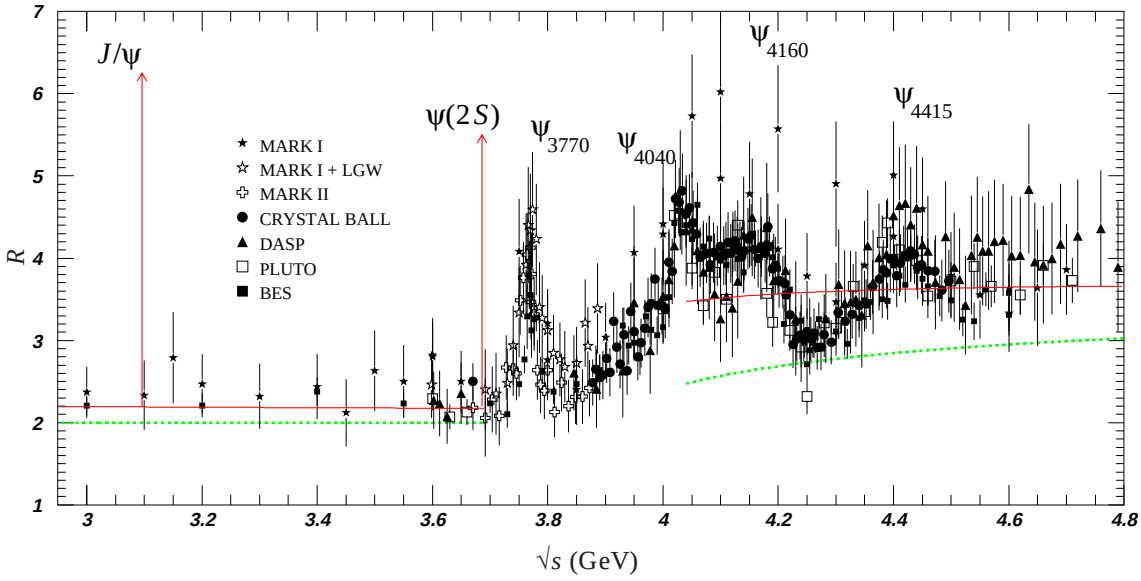

Figure 39.8: The ratio $R = \sigma(e^+e^- \to hadrons)/\sigma(e^+e^- \to \mu^+\mu^-$, QED-simple pole) in the $c\bar{c}$ region. (See the caption for Figs. [39.6–39.7]). **Note:** The experimental shapes of J/ψ and $\psi(2S)$ resonances are dominated by machine energy spread and are not shown.

MARK I: J.E. Augustin *et al.*, Phys. Rev. Lett. **34**, 764 (1975); and J.L. Siegrist *et al.*, Phys. Rev. **D26**, 969 (1982).
MARK I + Lead Glass Wall: P.A. Rapidis *et al.*, Phys. Rev. Lett. **39**, 526 (1977).
MARK II: R.H. Schindler, SLAC-Report-219 (1979).
CRYSTAL BALL: A. Osterheld *et al.*, SLAC-Pub-4160 (1986).
DASP: R. Brandelik *et al.*, Phys. Lett. **76B**, 361 (1978).
PLUTO: L. Criegee and G. Knies, Phys. Reports **83**, 151 (1982).
BES: J.Z. Bai *et al.*, Phys. Rev. Lett. **84**, 594 (2000); and J.Z. Bai *et al.*, Phys. Rev. Lett. **88**, 101802 (2002).

Not shown (J/ψ peak) :

MARK I: A.M. Boyarski *et al.*, Phys. Rev. Lett. **34**, 1357 (1975).
BES: J.Z. Bai *et al.*, Phys. Lett. **B355**, 374 (1995).

Annihilation Cross Section Near M_Z

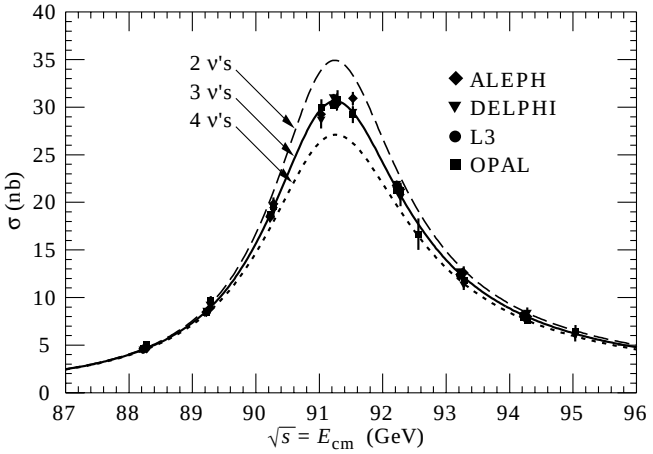

Figure 39.9: Data from the ALEPH, DELPHI, L3, and OPAL Collaborations for the cross section in e^+e^- annihilation into hadronic final states as a function of c.m. energy near the Z. LEP detectors obtained data at the same energies; some of the points are obscured by overlap. The curves show the predictions of the Standard Model with three species (solid curve) and four species (dashed curve) of light neutrinos. The asymmetry of the curves is produced by initial-state radiation. References:

ALEPH: D. Decamp *et al.*, Z. Phys. **C53**, 1 (1992).
DELPHI: P. Abreu *et al.*, Nucl. Phys. **B367**, 511 (1992).
L3: B. Adeva *et al.*, Z. Phys. **C51**, 179 (1991).
OPAL: G. Alexander *et al.*, Z. Phys. **C52**, 175 (1991).