SM/MSSM Electroweak Parameters
(mini-rapporteur talk)

Darien Wood
Northeastern University

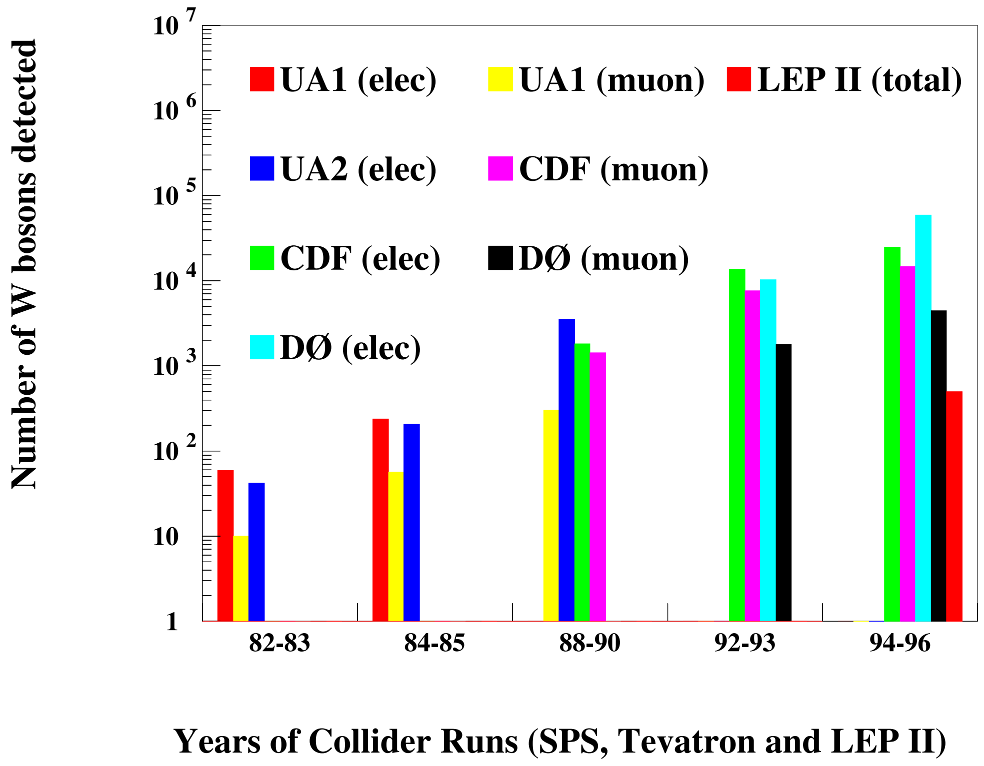
Hadron Collider Physics XII
Stony Brook
11 June, 1997

OUTLINE

- **Couplings**
  - $Wf\bar{f}$: W branching ratios and width
  - VVV: Trilinear Gauge Couplings
- **Mass Measurements**
  - Z mass
  - W mass
  - Top mass
- **Higgs Constraints**
  - Direct limits
  - SM constraints

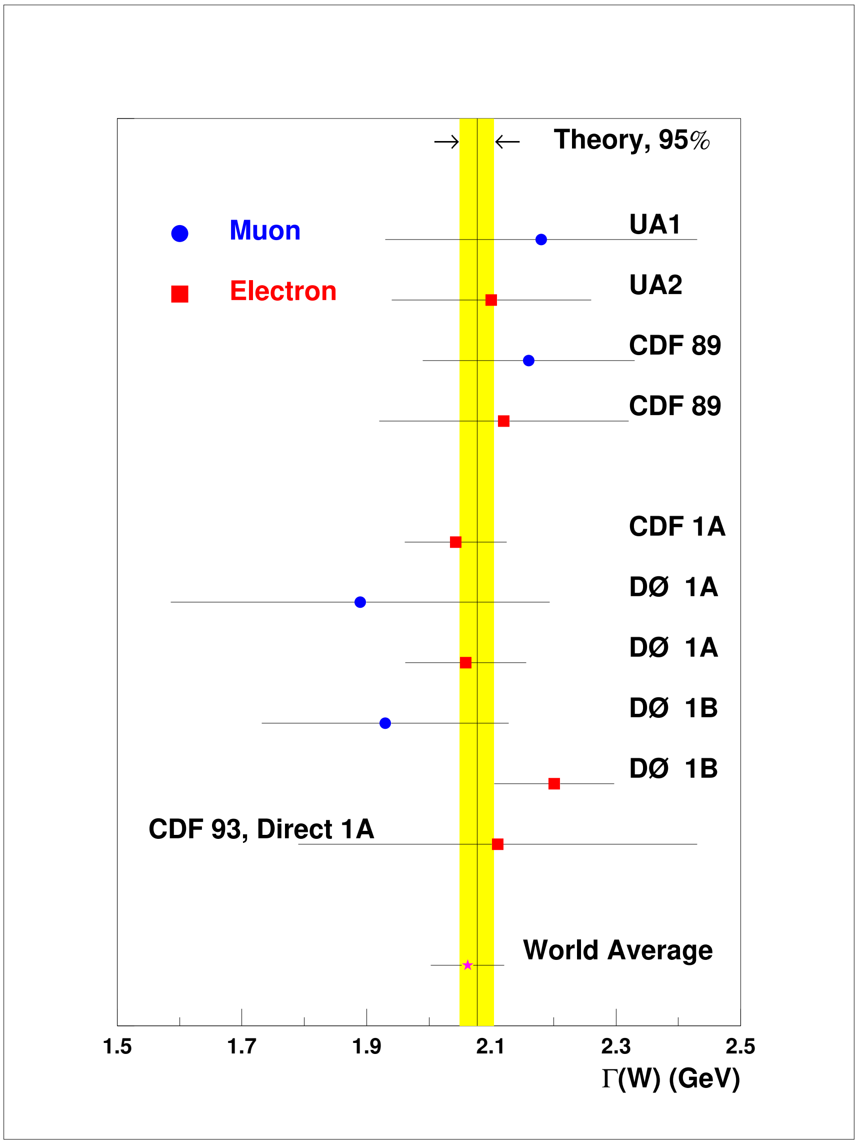
W Bosons Detected

Hadron Collider conference bias: emphasize W and top quark physics over Z physics:



- Tevatron "Run 1A" = 1992/93, $\int \mathrm{L}dt = 13\mathrm{pb}^{-1}$
- Tevatron "Run 1B" = 1994/95, $\int \mathrm{L}dt \sim 80\mathrm{pb}^{-1}$
- LEP2 161 GeV, $\int \mathrm{L}dt \sim 10\mathrm{pb}^{-1}$
- LEP2 172 GeV, $\int \mathrm{L}dt \sim 10\mathrm{pb}^{-1}$

W Width

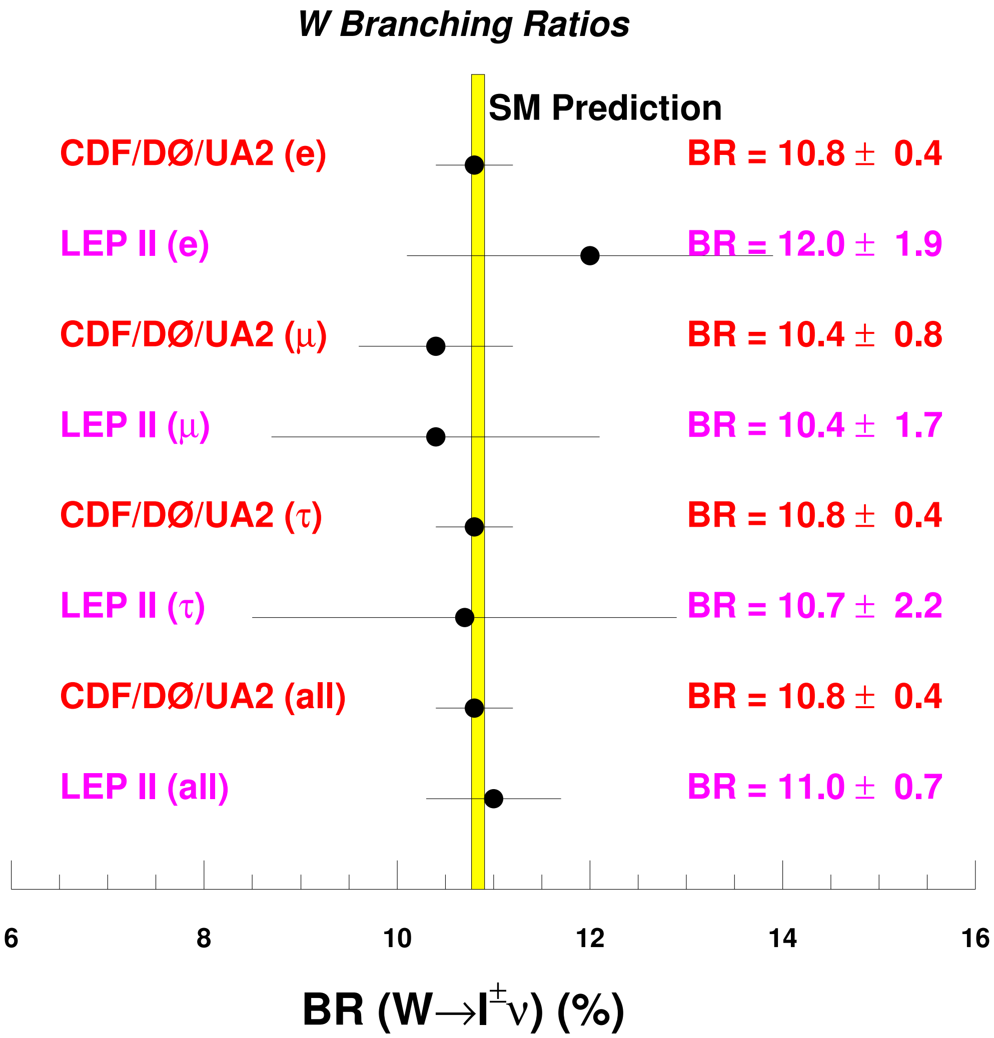


- Indirect measurement from:

$$R_\ell = \frac{\sigma(W)}{\sigma(Z)} \cdot \frac{B(W \to \ell\nu)}{B(Z \to \ell\ell)}$$

$$= \frac{\sigma(W)}{\sigma(Z)} \cdot \frac{\Gamma(W \to \ell\nu)}{B(Z \to \ell\ell)} \cdot \frac{1}{\Gamma(W)}$$

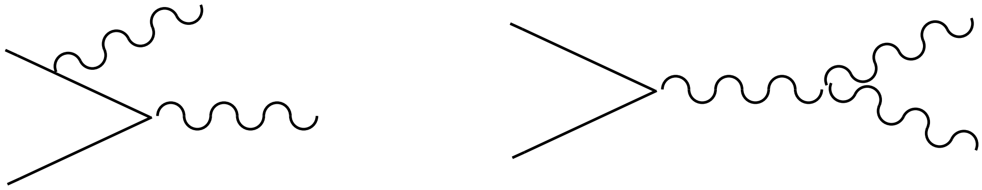
- direct measurement from tail of M_T distribution


W Branching Ratios
SM Prediction
CDF/DØ/UA2 (e)
BR = 10.8 ± 0.4
LEP II (e)
BR = 12.0 ± 1.9
CDF/DØ/UA2 (μ)
BR = 10.4 ± 0.8
LEP II (μ)
BR = 10.4 ± 1.7
CDF/DØ/UA2 (τ)
BR = 10.8 ± 0.4
LEP II (τ)
BR = 10.7 ± 2.2
CDF/DØ/UA2 (all)
BR = 10.8 ± 0.4
LEP II (all)
BR = 11.0 ± 0.7
6
8
10
12
14
16
BR (W→l±ν) (%)

W branching ratios

- **Hadron collider results:**
  - deduced from $R_\ell = \frac{\sigma(W)}{\sigma(Z)} \cdot \frac{B(W\to\ell\nu)}{B(Z\to\ell\ell)}$
  - τ channel deduced from $B(W \to \tau\nu)/B(W \to e\nu)$ (new DØ result) ($g_\tau^W/g_e^W = 1.004 \pm 0.019 \pm 0.026$)
  - only 1a results used in BR so far (except τ)
  - expect large improvement with final 1b results
- **LEP II results:**
  - more direct
  - statistics limited

Trilinear Gauge Couplings



- Standard Model $SU(2)_L \times U(1)_Y$ predicts existence of gauge boson self-interactions
- Hadron colliders:
  - $W\gamma$, $Z\gamma$, WW, WZ, ZZ
  - measure production rates and p_T spectra
- LEP 2
  - WW exclusively
  - measure production rates and angular distributions