Colour Reconnection LEP Group

CERN

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History

- Pre-Vancouver (1998), attempts to form group to combine (statistically limited) W multiplicities for CR studies, blocked by OPAL
- Renewed interest after Crete Workshop
- Recent WW00 FSI meeting had all experiments represented by people working in CR studies
  $\Longrightarrow$ formation of CR group, currently organised by myself
- One meeting so far, trying to define terms of reference, possible inputs for WW00 meeting on 19 April
- Second meeting 18 April

Multiplicities

- All experiments have public numbers
- In 1998, statistics were limited - now not really true

Experiment	Energy	$\Delta \langle n_{ch} \rangle = \langle n_{ch}^{4q} \rangle - 2 \langle n_{ch}^{q\bar{q}l\nu} \rangle$
ALEPH	189 GeV	$0.47 \pm 0.44 \pm 0.48$
L3	189 GeV	$-0.23 \pm 0.40 \pm 0.52$
OPAL	189 GeV	-0.15 ± 0.58
DELPHI	189 GeV	$-0.92 \pm 0.66 \pm 1.08$
ALEPH	183-202	$0.93 \pm 0.27 \pm 0.48$
SK1		~ -0.3
SKII,IIp		~ -0.2
Ariadne2		~ -0.2

Systematics largely uncorrelated?

- Naive average (100% uncorrelated) of 189 Gev results gives precision of about 0.3 units – same level as SK1 shifts reported
- $\Longrightarrow$ it may not be obviously a good idea, but not worth abandoning yet!
- Useful excercise to check what people are actaully doing!

Multiplicities program

Two multiplicity activites defined so far

- Comparison on systematic errors – already run through verbally (we are most complete!), summaries to be circulated
- Use of method on Crete Herwig files to check procedures

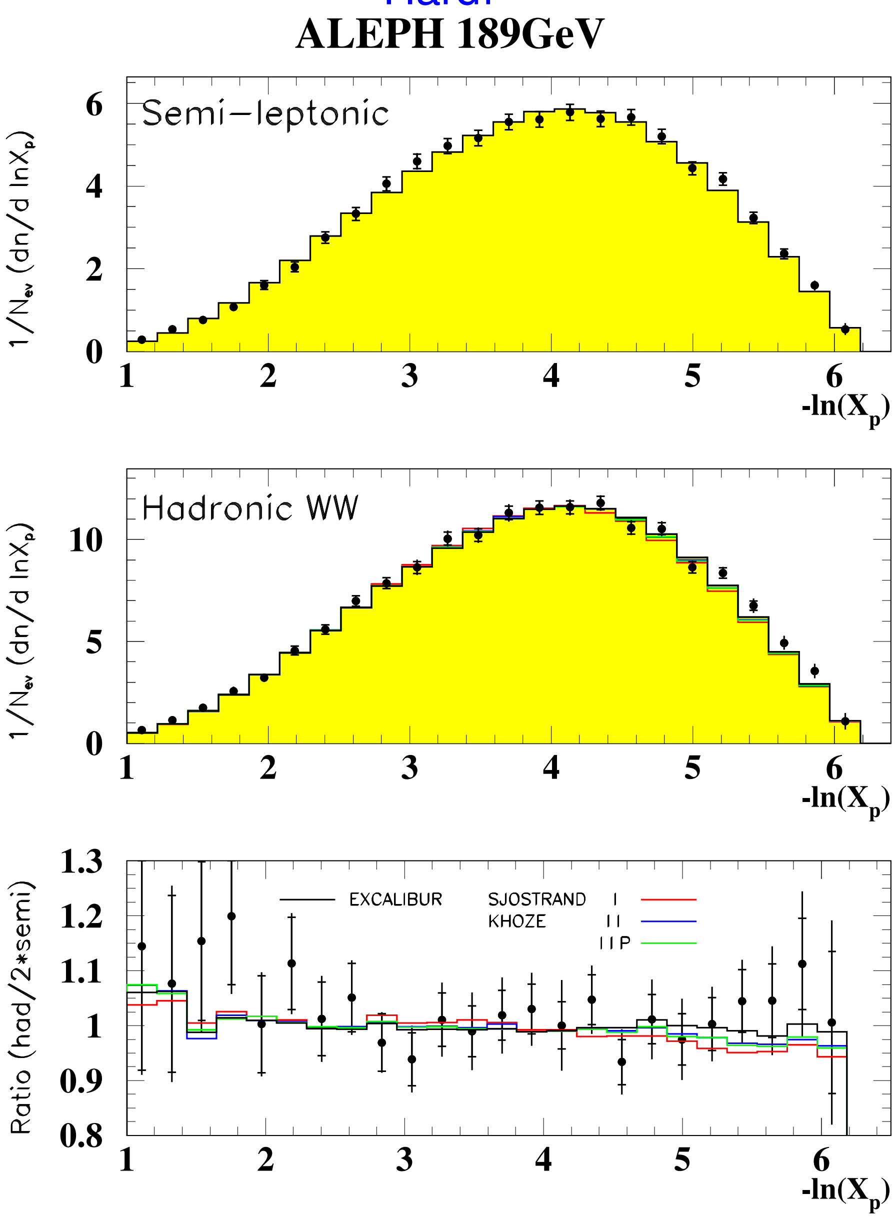
But what are we using as an observable?

- Acceptances in pT etc are not the same for each experiment
- Softer (and lower-pT) tracks could be most affected by C.R.
- Also, selections tend to disfavour C.R. events
- All bar ALEPH quote results fully corrected for pT and selections
- Hard to see how a combination can avoid using such an observable
  (hard to convince others to throw away low pT tracks, and no common selection)

Fragmentation functions?

Could combine (statistics limited) x_p fragmentation functions

Hard!



Better option - average multiplicities for tracks between 100 MeV and 1 GeV

C.R. Sensitive and statistics limited

DELPHI quote this but simply scale full mutliplicity errors!

Particle/Energy Flow

- Activity from all experiments
- Only one public set of data
- Systematics not well established

$\Longrightarrow$ Combination premature!

- First excercise – produce MC C.R. plots using Crete samples
- Do this for L3 and for varient selections
- Establish effect is general

Will follow this and other variables, and combine when experiments allow