ALEPH 92-189
PHYSIC 92-171
I. tenHave
21.12.1991

Minutes of the QCD / Inclusive particle production meeting: 17-12-1992
==========

present: Glen Cowan, Yuanning Gao, Pascal Perrodo, Cristobal Padilla, Philippe Odier, Ramon Miquel, Erich Feigl, Richard Alemany, Chris Markou, Robert Johnson, Ingrid ten Have

agenda:

- QCD:
  quark-gluon jet properties - Chris Markou
- IPP:
  Xi, Omega, how to proceed for a paper - Robert Johnson
- A.O.B.

Quark-Gluon Jet properties - Chris Markou
==========

Continuation of 25-11-1992: answers to questions followed by presentation of new material.
Neural network trained on data, using VDET information to distinguish between quark and gluon jets. Analyse 3-jet events without b-tagging. Highest energy jet, J1, 96 % quark. The second and the third jet are taken to be the first and the second jet on the jet bank after removal of the highest energy jet. This way jet 2 and jet 3 are chosen semi-randomly. As the probability for the jetfinder to find the more energetic jet first is higher, J2 displays more "quarkness" and J3 more "gluonness".
A fit to J1 in the 3 jet sample results in a 5.9 % contribution from gluon jets, to be compared to the expected 4 %. A study of the "quarkiness" of J2 and the "gluonness" of J3 gives: Pq(J2) = 73% and Pg(J3) = 83% respectively. This is to be compared to 78% and 81% in the training sample. The fractions obtained are in good agreement with the expectations.
When the analysis is repeated on a Monte-Carlo sample a good agreement between the data and Monte Carlo spectra is found for J1, J2 and J3.
A comparison of the XE-spectra with those obtained by Thomas Meid shows that at low XE the curves are reversed: the gluon distribution lies above the quark one. This seems to be an energy problem, for a particluar energy selection this discrepancy disappears.
The angular distributions between J1 and the quark jet and J1 and the gluon jet are different. The cross-section J1-quark jet rises as the angle approaches 180 degrees.
In 3-jet events, E2 > 21 GeV, E3 < 26 GeV yields similar multiplicities for quark and gluon jets. The J1-gluon jet-quark jet-J1 multiplicity spectrum (similar to the Opal study) has been presented.

There will be a meeting on quark-quark-gluon studies on the 12th of January at CERN.

Xi, omega studies, how to proceed to a paper - Robert Johnson

No fundamental change with respect to the conference results presented previously; systematics studies added. For detailed numerical results see tranparencies.
A Xi(1530) signal has been shown, a Xi is combined with a pion candidate at the origin. The mass is found to be 1535 +- 1 MeV, which is slightly high compared to the PDG value of 1531.8 MeV. The width is measured to be 8 +- 2 MeV, which is in good agreement with the PDG natural width of 9 MeV.
A fit to the Xi cos(theta*) distribution, which is consistent with being flat, yields: P = 0.24 +- 0.15. A polarisation of 25% has a neglible effect on the efficiency.
The c.tau for lambda is one sigma low, the Xi c.tau is in good agreement with the PDG value.
The Xi, Xi* XE distributions are well described by JETSET 7.3 both in shape and in normalisation. However, comparing the Xi* rate to OPAL, our rate is higher, contrary to the omega rate. The fact that the Opal omega rate is 4 times higher than ours may be related to the fact that they use a 15 MeV binning, while a conservative resolution estimate yields 7-8 MeV. They claim a degraded mass resolution due to kaon decay. This argument is not understood.
The Xi, Xi* and omega will be described in a separate paper from the lambdas and K0's for the following reasons:
1) a combined paper would be too long,
2) the analyses use different algorithms that would both have to be described,
3) the people working on the two subjects work on different sides of the world.

Work that needs to be done:
1) study the lambda spectrum, compare to Andy Wright's results,
2) included the 1992 data,
3) study polarisation.

Time scale: spring 1993.

A.O.B.

On K0's: Saclay and Peter Hansen/Bertram Rensch agree on the 1991 spectra. The problem could lie in the 1990 Monte Carlo, which does not agree with the data nor with the 1991 Monte Carlo on the cos(theta*) distribution. This could correspond to a known deviation at low energy that led to the problem in the background estimate.
Gerald Rudolph obtained results for s/u and qq/q when including the K0, and lambda spectra from Bertram Rensch. Both the sphere AND the new linear fit yield: s/u = 0.28 and qq/q = 0.10. The slightly lower s/u ratio gives a somewhat better fit to the K0 spectrum.

next meetings:

quark-quark-gluon studies	: 12-1-1993
QCD	: 13-1-1993
Inclusive particle production	: 20-1-1993