ALEPH 94-16
PHYSIC 94-12
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16.2.94

Minutes of the QCD Meetings of 27 Jan. and 10 Feb. 1994

There were three status reports:

(1) Anne Moutoussi(27.1.)...	Quark/Gluon Update
(2) Gerald Rudolph(10.2.)...	A New Method to Measure the String Effect and Update on the K^0-Spectrum Analysis
(3) David Binnie(10.2.)...	The "Two-Halves of an Event" Analysis

(1) Anne gave an update of the analysis she and Christos have been working on. The idea is to select a tagged gluon sample (with 80-90% purity) and a symmetric quark/gluon sample (i.e., 50% purity) and unfold the quark and gluon properties using the two samples. The improvements in the method since presented by Christos at a Thursday meeting have been to vary (and increase) the purity and increase the Monte Carlo statistics. The result is now stable, around $N_g/N_q = 1.20 \pm 0.06$. The next steps are to increase the statistics using the '93 data and to extract the other distributions (rapidities, etc.).

(2) Gerald showed a new idea for trying to get a quantitative handle on the string effect, by measuring the azimuthal asymmetry of momentum flow with respect to the jet directions in the event plane of 3-star events. The transparancies explain the details, and the result is that the asymmetry can be reliably measured and there is a significant discrepancy between the '92 data and the '92 full Monte Carlo. A nice quantitative comparison is seen in the "asymmetries as a function of angle" plot. The source of this discrepancy is being sought.

Then Gerald showed his latest attempts to understand the K^0 spectrum. In the version where he allows the σ_s to vary from $\sigma_{u,d}$, fitting the $p_\perp$ spectrum in addition to the momentum (ξ) spectrum gives reasonable agreement between the data and Monte Carlo with a value σ_s=0.67, large, but maybe not unreasonably large. (Previously, fitting only the ξ distribution gave σ_s>1, which was considered unreasonably large.)

(3) As a reminder, David's analysis splits an event into 2 halves around the thrust axis, then the hemishpere sum of the $|p_t|$ of the particles relative to the hemisphere thrust axis is formed for the each of the two halves. An increase of the mean p_t on one side as a function of the $\sum |p_t|$ on the other side is seen with a positive correlation coefficient of $\approx$7%. The explanation for the correlation given in the QCD meeting of 18.Nov.1993 was proposed to be the string effect, based on many considerations including ruling out simple explanations such as energy-momentum conservation. At the present meeting David presented more quantative evidence, based on the comparison with Monte Carlo data. Using Jetset, there is a very small correlation at parton level, while the hadron level looks very much like the data, a fact which would support the string interpretation. David continued to experiment with toy models to test the ideas. He then turned to the question of the origin of the string effect: does it originate in the non-perturbative phase or in the perturbative phase? I.e., is it due to the classical "Lund string", whence the name of the effect, or is it due to quantum-mechanics of the parton shower evolution

(the so-called QCD coherence)?. The latter effect is built into the color dipole shower evolution of Ariadne, so David compared the Ariadne and Jetset Monte Carlos. Jetset seems to describe the data well, while Ariadne shows a correlation between the 2 halves of an event which is too large. Perhaps the reason is that Ariadne has QCD coherence built into the parton shower followed by string fragmentation, which may be tantamount to putting the effect in twice. Studies are continuing to see whether this is true and to evolve the understanding.

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