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To/A: The members of the ISRC

From/De: Experiments R807, R808 (Axial Field Spectrometer Collaborations)

Subject/: Light Ion Running in Summer 1983
Concerne

We were pleased that it was found possible to accomodate another run, albeit short, of light ions before the ISR shutdown. Our primary goal is an improved measurement of the intriguing high- p_T single-particle cross-section ratio for $\alpha\alpha/pp$, and a search with much greater sensitivity than before for new phenomena associated with very high hadron densities. Our main triggers will then be:

- i) Very high E_T in the central region full azimuth calorimeter
- ii) A high p_T single particle anywhere in this calorimeter
- iii) electron-pairs and photons, the latter in the NaI walls
- iv) triggers based on particle multiplicity.

Ideally one would like $\alpha\alpha$ with 63 GeV/beam and the SCLB insertion operational with good beam conditions. Given the very limited time available for prior machine development and for setting up and running the light ion program, we believe that to insist on such a mode would not be in our best interests. A proper confirmation and improvement of the previous intriguing high p_T results really needs 63 GeV α -beams, both because that is where the previous results were obtained and because only there can the correct comparison energy for pp collisions be realized without a new machine tune. Not to use the SCLB insertion, with the consequent gain of $\sim x7$ in luminosity, is very frustrating. We request in those circumstances to maximise the integrated $\alpha\alpha$ luminosity by running $\alpha\alpha$ for essentially the full two-weeks available, to achieve at least 200 hours of stable beams. We do not wish to be in the position of having important new results with marginal statistics. If this $\alpha\alpha$ running is achieved and there is time we would like one α -beam replaced with a p-beam (preferably 15 GeV) for a final 24-hour $p\alpha$ run.

We have seriously considered the alternative of 53 GeV α beams with the SCLB operational to achieve more integrated luminosity even in a 100 hour-run. There exist good arguments also for this alternative. However, as stated above, the R110 measurements of the high p_T π^0 cross-section ratio were with 63 GeV α beams, and no correct comparison energy for pp exists.

We request, before the $\alpha\alpha$ run, a 50-hour pp run at 15/15