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The question of a special vacuum chamber in I8 for the very low p_T experiment and compatibility between this experiment and R801.

British-Scandinavian-MIT collaboration.

Vacuum chamber

In the proposal for the study of inclusive particle production at very low p_T and x=0 it was stressed that in order to do a completely inclusive measurement on low momentum proton production, special care has to be taken to suppress the background. The obvious way to do this is to require thin windows in the vacuum chamber. The reason for this is two-fold:

1. By reducing the multiple scattering for particles leaving the vacuum chamber, strict vertical cuts can be applied to the beam height in the intersection region thus reducing the background from beam-wall interactions. The maximum gain using a 0.035 mm s.s. window would be a factor 2.

2. Thin windows present a less massive target for beam-wall interaction which would be observed as a background in the vertical projection. Since thin windows require the rest of the vacuum chamber to be made uncorrugated and, say, 2 mm thick, there would be no gain in making only one exit window (it is the sum of the wall thicknesses that has to be minimized). With two windows, each 0.035 mm s.s., the beam-wall background could be reduced by a factor 6.

(Another advantage of a thin window is an increased range for the detected particles of 0.2 g/cm^2 in a total of about 1 g/cm^2).

It is however clear that only beam-wall background will be reduced this way and the total gain might be limited by the level of beam-gas background. Accurate knowledge

of the ratio beam-wall to beam-gas background is not available, but from diamond maps obtained by R203 we estimate that beam-wall interactions are the main source of proton background.

It can be questioned whether it is necessary to record particles in a completely inclusive way. With an elaborate "monitor" such as is provided in I8 by the detection system of the Pisa-Stony Brook collaboration, R801, the beam-beam events can probably be defined in an almost inclusive way. They claim to have a detection efficiency for beam-beam events of more than 98 %, which is essentially s-independent. Being offered to use their detectors the advantage of a special vacuum chamber is marginal.

Compatibility with R801.

The installation of the small spectrometer at 90^{o} in I8 only effects 1/4 of the counters of R801 surrounding the intersection and would not interfere with their forward detection systems. Both groups are keen to cooperate in the exchange of information between the two experiments. As has been indicated above, the equipment of R801 will be an ideal monitor (and beam-beam trigger) device, which is known to have the accuracy required for a study of a possible s-dependence in the inclusive production cross section. On the other hand events selected by the spectrometer can be used for correlation studies by R801.

Conclusion.

Having access to signals from R801 the requirement of a special vacuum chamber is removed, unless R801 has a definite interest for a similar chamber in order to improve the precision of their measurement of beam profiles Therefore the decision on the vacuum chamber need not be coupled to an approval of the experiment.

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