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INTEGRATED HIGH-RATE TRANSITION RADIATION DETECTOR AND
TRACKING CHAMBER FOR THE LHC

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Summary

A first prototype (~ 200 straws embedded in a polyethylene foam radiator) was built to test these ideas. Data were taken with this prototype at the SPS during a short first test in July 1990.

The preliminary results give the e/π rejection power of such a TRD/tracker for isolated particles in the range $10^{-3} + 10^{-2}$ for pions, with an energy up to 50 GeV and a detector length of ~ 80 cm. The tracking capabilities were also measured. The spatial accuracy is ~ 0.3 mm and the angular accuracy ~ 1 mrad.

A new prototype with ~ 1200 straws, sufficient to contain a high energy jet and followed by a fine-grained calorimeter will be tested in 1991.

The front-end electronics, based on the novel concept of optical fibre readout by means of electro-optical modulators, will be developed. In parallel, fast preamplifiers combined with low mass cables will be prepared.

An engineering prototype will be constructed in 1993 to verify the design for a large detector. Signal readout for the straw signals and trigger processors correlating the TRD signal with external detectors will be developed.

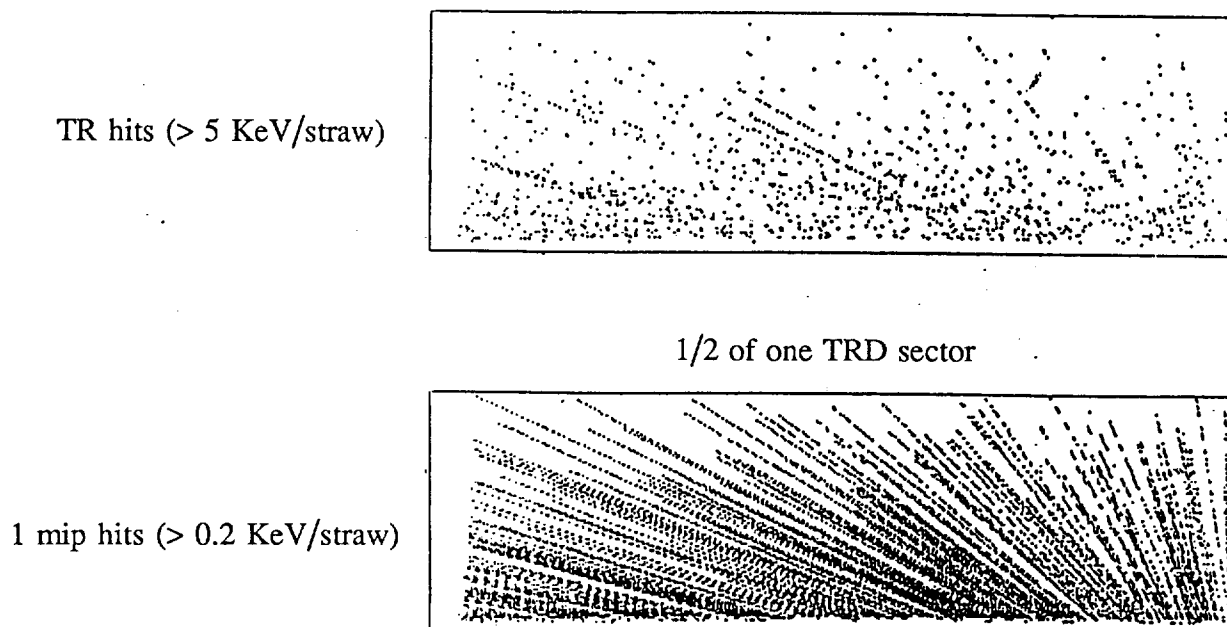


Fig. 1 Monte Carlo simulation of TRD tracking.
 $L = 4.10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ (100 min bias pile up events)