Report for the instr. sub-committee 28.2.86

Position Sensitive Detector Developments at ILL A.Oed

Multiwire proportional counters (MWPC) were conceived fifteen years ago, and an impressive amount of work has been done to improve the general operational characteristics of the device From the beginning yet, this approach engendered two problems which could not been solved satisfactory: Great skill and a long experience are necessary to produce a cathode-grid made of thin wires having a diameter of about 10 micro-meter; moreover their equal spacing is very important in order to ensure a uniform amplification over the detector-area. These thin wires are the main source of many technical and electrical problems. The second point which is even more essential is the fact that the operation gets increasingly difficult at smaller wire spacing than one millimeter. A fact that has generally prevented taking the obvious direction for higher position resolution.

There obviously seems to be no answer to these difficulties with a MWPC. As proposed at the last year instrument-subcommittee-meeting ,an entirely new position sensitive gas-detector has therefore been developed under the designation "Microstripe proportional counter" (MSPC). This detector contains no wires at all. Its cathode is made of very thin stripe-layers on a glass substratum ;the applied electrical potential alternates between each stripe. To produce this cathode the technique of micro-lithography is applied as used for the fabrication of integrated circuits . A cheap and multiple contact-reproduction of this cathode is thus possible with very high precision. Measurements with this new cathode type which will be reported at the meeting. have shown surprising and promising properties of this arrangement. Among other things it seems to be possible to reach a position resolution near the micro-meter range, even with large detector areas.

A two dimensional MSPC of 80 mm x 80 mm surface area as well as a "foil"-MSPC-detector in which the neutrons are captured in a thin foil of high absorption cross-section and where the escaped ionizing particle delivers the signal, are under construction.

©1986 Institut Laue-Langevin