VARIOUS EXPERIMENTS WITH THE OMICRON SPECTROMETER

B.W.Allardyce[3], H.Arnold[5], J.Bailey[4], K.Bos[3], T.Bressani[8], E.Chiavassa[8], S.Costa[8], J.D.Davies[2], G.Dellacasa[3], D.Frame+, M.Gallio[8], G.Kernel[6], E.G.Michaelis[3], A.Musso[8], M.Panighini[8], A.Stanovnik[6], N.W.Tanner[7], R. van Dantzig[5], W. van Doesburg[1]

AMSTERDAM[1] - BIRMINGHAM[2] - CERN[3] - DARESBURY[4] - IKO[5] - LJUBLJANA[6] - OXFORD[7] - TORINO[8]

A series of experiments will be performed using a spectrometer with both a large solid angle and a large momentum acceptance; it will have an energy resolution of about 1 MeV for particles with momenta up to about 400 MeV/c.

The spectrometer consists of a large magnet with a usable field volume of 1 m x 2 m x 0.85 m. The magnetic field is homogeneous to within about 10 % over this volume, in which it is intended to place planes of multiwire chambers in front of a target, followed by arrays of multiwire and drift chambers and thin scintillators. Various geometries are possible, but the intention is to detect inside the magnet both the incident particle and the one(s) leaving the target over a large angular range. The information from the various detectors will be handled on-line by an HP computer system, which also performs some preliminary analysis. Further analysis will be done on a large computer, making use of well established pattern recognition techniques.

The experiments of interest to such a spectrometer cover a wide range, but recently attention has focused on a smaller group of experiments for which detailed calculations have been made. Thus for the present, the initial programe is as follows:

i) Scattering of π ,μ at backward angles from light nuclei (energy range 100-300 MeV/c).

ii) Double charge-exchange reactions (π^+,π^-) especially $^{18}O(\pi^+,\pi^-)$ ^{18}Ne (mirror states).

iii) The branching ratio for the extremely rare decay mode $\pi^0 \rightarrow e^+e^-$.

+M.P.I. für Physik, Munich