

A Concept for a New Type of Magnetic Septum Quadrupole, M. MARX, B. PARKER, and

H. WUEMPELMANN, DESY - It is proposed to cut away much of the iron from a standard quadrupole mirror plate, as found in a HERA QS-type interaction region quadrupole¹, so as to create an iron magnetic septum quadrupole with only minimal field distortion. Near the centre of a quadrupole, unlike the region near the notch in a Lambertson-type dipole magnet, the B-field naturally goes to zero and thus problems of septum iron saturation should be able to be avoided through a careful choice of geometry. This expectation is born out in 2-D field calculations. It is found that having extra iron in the notch actually causes problems and mirror plate geometries with a small centre septum gap actually give better results. For example configurations with a 1 mm gap at the point of the notch exhibit very little field penetration (^a few gauss) in the reduced field region outside the septum, even with ^a 30 T/m quadrupole gradient inside the magnet. Possible applications such as interaction region luminosity increase, simplified optics matching for beam extraction and/or injection and forward angle particle detection of are discussed.

1 R. Brinkmann, DESY HERA 92-07 (1922) 26.