

## THE COOLER-SYNCHROTRON COSY \*)

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The combined synchrotron-cooler-ring COSY<sup>+</sup>) is proposed to provide the Nuclear Physics Institute (Institut für Kernphysik) of the KFA Jülich and the cooperating universities<sup>++)</sup> with an advanced research tool. An energy range of about 20 MeV to about 1.5 GeV is envisaged. The existing cyclotron JULIC will serve as an injector for a variety of ions. Alternatively injection into COSY from a high-current linear accelerator would create a attractive situation.

A close cooperation of KFA and university groups in particular in Northrhine-Westfalia is envisaged for construction as well as for use of the facility.

COSY is basically a hexagonal synchrotron ring consisting of six identical separated function unit cells (see fig. 1). For acceleration in the fundamental harmonic a RF-system will be installed with a frequency range 0.5 MHz to 2.0 MHz. This allows acceleration from an energy of 40 MeV protons up to the bending limit. The ring has the two functions of a storage ring and an accelerator. Two long straight sections with telescopic beams are provided, one to accommodate an electron cooler the other one for beam manipulations (e.g. dispersion matching) at the main experimental target area where the best focus is located for the BIG KARL spectrometer. A 7 m bending radius was chosen. In a first stage (Stage I) operation up to 500 MeV protons is achieved at a magnetic field of 0.5 T. This is most suitable for nuclear structure studies in the so called "energy window". In a second step the magnetic field is increased to 1.1 T (Stage II) corresponding to an energy of 1.5 GeV for protons (2.25 GeV/c). This energy is well above several interesting thresholds for meson production and yields high momentum transfers in scattering experiments. A particular property of COSY is the possibility to reduce the phase space of intense beams by an electron cooler, initially with similar specifications to the one now under test at the LEAR ring at CERN. As experience develops, a more powerful cooler could be installed later on, allowing the cooling of

\*) This article contains a short summary of a proposal available from Institut für Kernphysik der KFA Jülich. Details and references are given in the proposal.

+) COSY = Cooler Synchrotron

++) In particular the Universities in Northrhine-Westphalia with Nuclear Physics groups (Bochum, Bonn, Köln, Münster)

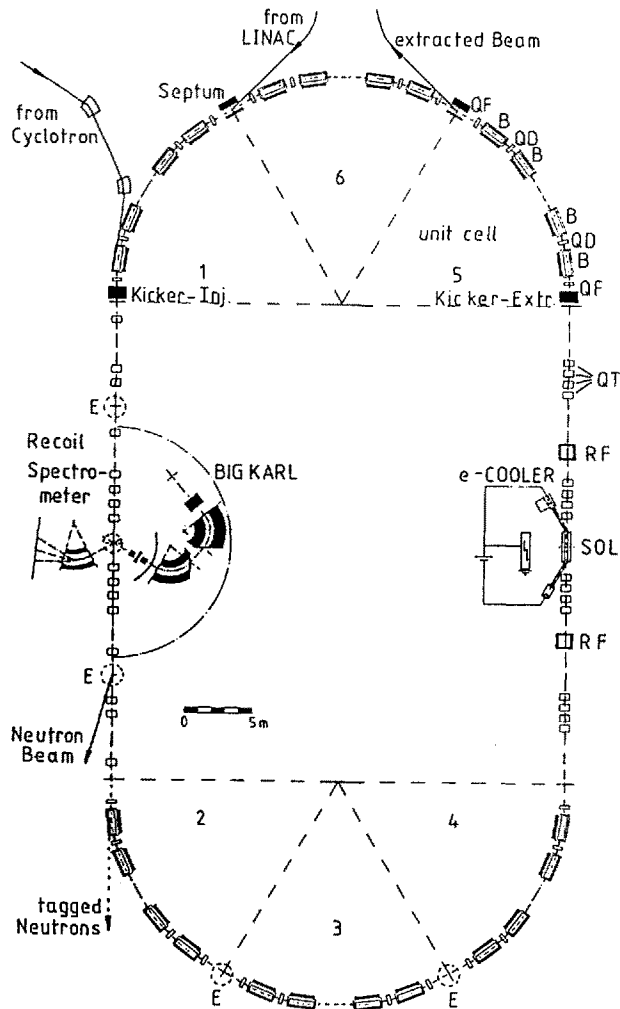


Figure 1:  
Schematic view of the COSY with the essential elements of the ion optical system

QF, QD	=	Horizontally focussing and defocussing quadrupoles
QT	=	Telescope quadrupoles
B	=	Bending magnets
RF	=	Acceleration cavities
E	=	Experimental areas
SOL	=	Solenoid .