

NEW LINES OF RESEARCH WITH THE MAGNEX LARGE-ACCEPTANCE SPECTROMETER

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A new design of magnetic spectrometer, MAGNEX [1], is under construction for the INFN-LNS, Catania. It is primarily intended for use with the Tandem-accelerated radioactive beams from the EXCYT facility [2]. Both projects are expected to be completed by the half of 2004.

The unique features of MAGNEX are its solid angle of acceptance (51 msr), momentum acceptance (10%), overall momentum resolution of 1/2000 and mass resolution of 1/200, together with a focal plane detector having a low detection threshold (0.5 MeV/A). The spectrometer is based on a 55° bend angle dipole magnet with mean radius of 1.6 m. It is designed for a maximum rigidity of 1.8 Tm. Despite the large acceptance, a good momentum resolution is achieved by a combination of careful ion-optical design [3] and software ray-reconstruction. The latter depends on three things: the availability of detailed field maps, the precise measurement of position and angle by the detection system, and the solution to high order of the equation of motion based on, in our case, the program COSY INFINITY of Berz [4].

The MAGNEX spectrometer will provide new opportunities for, e.g., studies of weakly-bound as well as heavy shell-stabilized nuclei via direct reactions, nuclear reactions with large isospin numbers, and nuclear astrophysics with both stable and radioactive beams.

- [1] A. Cunsolo *et al.*, Proc. Workshop Giornata EXCYT, Catania (1996) pp. 143-161, Proc. Workshop II Giornata EXCYT, Catania (1997) pp. 71-80.
- [2] G. Ciavola *et al.*, Nucl. Phys. **A616** (1997) 69c.
- [3] A. Cunsolo *et al.*, Nucl. Instr. Methods A **481** (2002) 48; **484** (2002) 56.
- [4] M. Berz, Nucl. Instr. Methods A **298** (1990) 473.