Forward

Physics at Laboratori Nazionali del Sud: from nuclear dynamics to radiotherapy applications

INFN-LNS, INFN-Sezione di Milano, IPN-Orsay and Rochester University collaboration

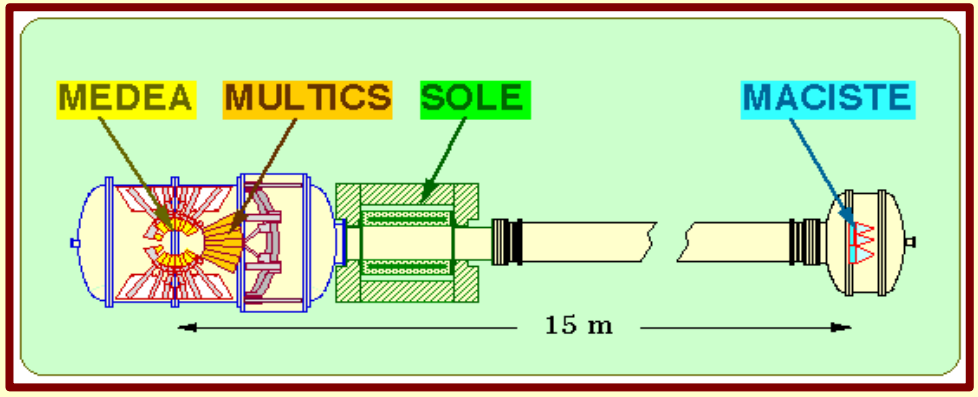
Number of Italian Researchers:12

Spokesperson:R.Alba (Alba@lns.infn.it)

Main topics:

- **Entrance channel charge asymmetry effects on nuclear dynamics**
- **Reaction cross sections of interest in radiotherapy with ion beams**
- **Study of exotic nuclei produced in projectile fragmentation**

The apparatus



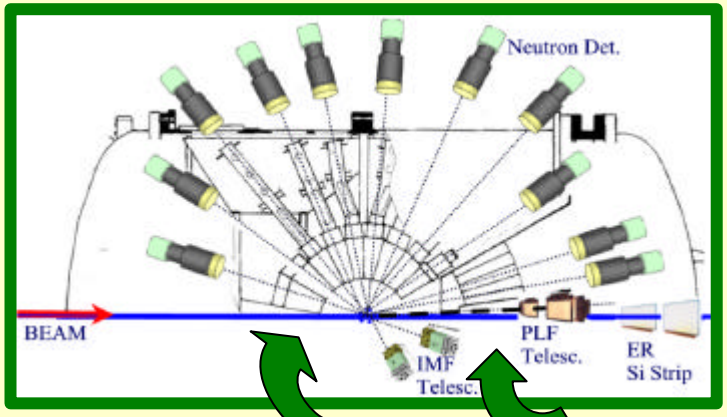
MEDEA	MULTICS	MACISTE
$30^{O} \leq \vartheta \leq 170^{O}$	$3^{O} \leq \vartheta \leq 28^{O}$	$\vartheta \leq 6^{O}$
γ - rays , LCP	IMF,LCP, PLF,ER	PLF,ER

- **MEDEA: 180 20 cm thick BaF_2 modules**
- **MULTICS: 56 I.C.,Si,CsI telescopes**
- **SOLE: Superconducting solenoid to collect forward products**
- **MACISTE: 8 gas-plastic position sensitive telescopes**

Present status

Isospin effects on nuclear dynamics

(collaboration INFN - Rochester University)



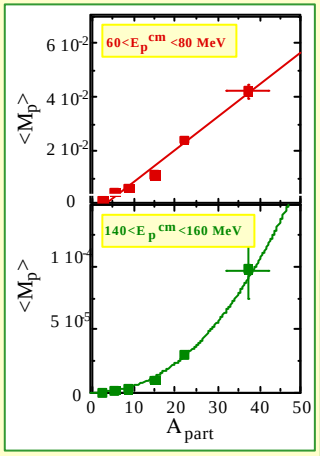
The experiment has been performed in May 2001 with Superconducting Cyclotron beams. The MEDEA - MULTICS apparatus has been upgraded to detect also neutrons and heavy residues and to increase the angular range for IMF detection. Simultaneous measurement of such a large number of species in different Ni + Sn isotope reactions has produced a whole and consistent set of data whose interpretation should greatly improve the knowledge of the nuclear potential asymmetry term.

MACISTE detector tests

- The dependence of the scintillator and drift chamber responses on the impact point has been studied.

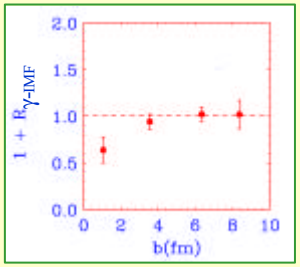
Planned experiments (approved by LNS PAC)

- Characterization of reaction products for radiotherapeutic purposes
- Characterization of exotic PLF's (collaboration INFN – IPN Orsay)



Phys.Rev.Lett.- in press

Quadratic dependence of extremely energetic proton multiplicity on the mean number of participants: an evidence of the **onset of mechanisms beyond mean field and two body nucleon-nucleon collisions**.



Thermal photons - IMF anticorrelation: an evidence of the **onset of prompt fragmentation** *in 45 A MeV Ni + Au central collisions.*