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Summary

USE OF ^{12}C PROJECTILES AT ENERGIES UP TO 86 MeV/NUCLEON FOR STUDYING THE DISSIPATIVE PHENOMENA IN NUCLEAR COLLISIONS.

Groupe de Chimie Nucléaire, Institut de Physique Nucléaire, B.P. n° 1, 91406 - Orsay, France.

R. Bimbot, B. Borderie, J. Galin, D. Gardès, B. Gatty, D. Guerreau, M. Lefort, J. Péter, M.F. Rivet, B. Tamain and X. Tarrago

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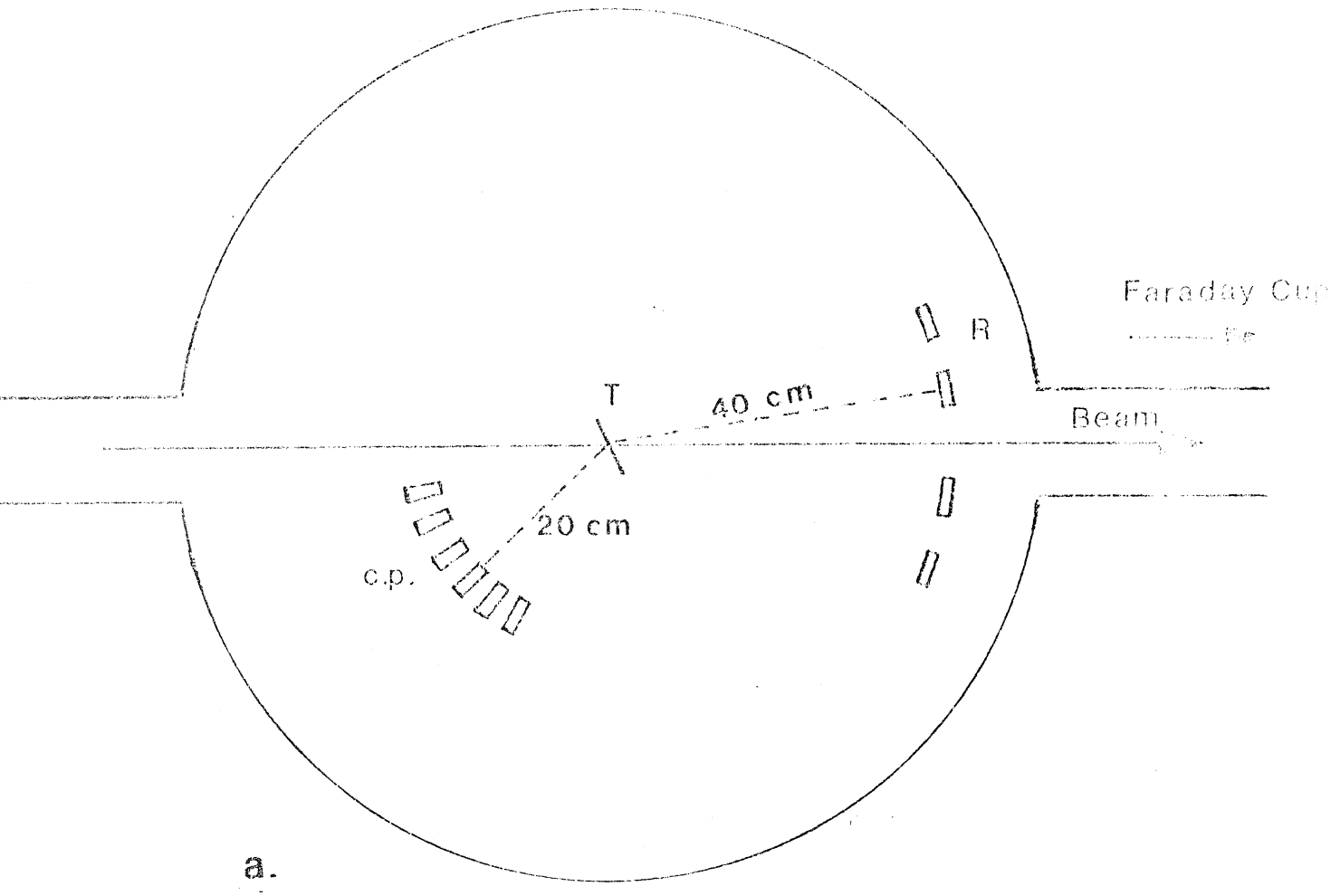
The aim of our experiment is to study the evolution, when the incident energy is increased, of two highly dissipative phenomena : the compound nucleus formation (and deexcitation), and the deep inelastic collisions.

For this purpose, the heavy nuclear residues from these reactions will be detected in coincidence with the light evaporated charged particles resulting from the deexcitation (H,He). A time of flight technique will be used to identify the mass of the residue. From the mass of the residue, its energy and angular distributions, and from the angular and energy distributions of the light charged particles measured together with their multiplicity, we hope to be able to get a good signature of these processes. The study of their evolution from 20 MeV/A to 86 MeV/A, for one target, and from a Ni to Tm target at 86 MeV/A may yield information on the limits for the fusion process, on the behaviour of highly excited nuclei (existence of a boiling point of nuclear matter, role of the preequilibrium emission in the deexcitation) and on the possible transition from completely damped collisions to reactions described by the fireball model.



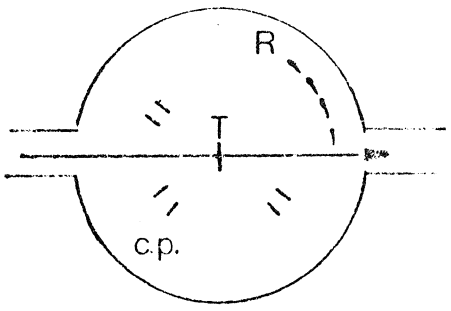


Figure 1 : Experimental set-up

a) for angular distributions of light charged particles (H,He). The angles θ_R are fixed (± 5 to 20°), and the angles $\theta_{c.p.}$ are varied from 10 to 170°.

b) for angular distributions of heavy fragments. The angles $\theta_{c.p.}$ are fixed and the angles θ_R are varied from 5° to 60°.

The symbol T denotes the target, R the four SSD used to measure the residues at the angles θ_R, c.p. the six telescopes used to detect the light particles in coincidence, at the angles θ_{CP}. The multiplicity measurements are performed at the same time as the angular distributions.