

Service de Physique Nucléaire
SÉMINAIRE

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The dynamical dipole mode in heavy-ion collisions

Brunella Martin

CEA Saclay - SPhN

An interesting feature of dipole excitation in dissipative heavy-ion collisions is the so-called Dynamical dipole mode, predicted to occur between interacting ions with a very different N/Z ratio. During the charge equilibration process between the colliding ions a large amplitude collective dipole oscillation can be triggered along the symmetry axis of the deformed dinuclear system. This pre-equilibrium oscillation can decay by emitting prompt dipole radiation with peculiar characteristics.

The study of the dynamical dipole mode can give important information about the early stages of dissipative reactions and on the charge equilibration mechanism in connection to the reaction. Moreover, by using radioactive beams, the dynamical dipole mode can give information on the density dependence of the symmetry energy in the Equation of State at nuclear densities lower than the saturation one. Finally, it can represent an efficient cooling mechanism of the composite system in the fusion path which might facilitate the superheavy element formation.

In my talk I'll present the results of a systematic investigation of the dynamical dipole mode in fusion reactions, performed with the group of Naples (Italy). We inferred its characteristics and its dependence on the beam energy. The first angular distribution data of the associated radiation observed at 16A MeV, support its prompt dynamical nature, showing that it is associated with a dipole oscillation along the symmetry axis of the dinuclear system triggered at the early stage of the fusion path .

Finally I will compare our data with calculations performed within a BNV transport model and based on a collective bremsstrahlung analysis of the reaction dynamics.