COLLECTIVE EXCITATIONS OF ATOMIC NUCLEI

Muhsin N. Harakeh, KVI-CART, Groningen, the Netherlands

More than seven decades ago, the isovector giant dipole resonance (IVGDR) was discovered in γ-ray absorption spectra. Its macroscopic properties such as excitation energy, width and exhaustion of the Thomas-Reiche-Kuhn sum rule were determined in the following years for stable nuclei up to uranium.

A rich spectrum of other giant resonances of different multipolarities and spin and isospin structure was expected on theoretical grounds. In the seventies, the isoscalar giant quadrupole resonance (ISGQR) was first discovered in electron scattering followed by the isoscalar giant monopole resonance (ISGMR) in inelastic α scattering.

A historical overview of the discovery of giant resonances will be given and their description in terms of macroscopic and microscopic models will be outlined. Collective modes are not only important for nuclear structure studies but also for determining key parameters of the equation of state (EOS) of nuclear matter.

With the advent of radioactive beam facilities perspectives for giant resonance studies will be outlined.