Giant Resonances built on cold nuclei

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Giant Resonances are a type of high-energy collective states of the nucleus, characterised by a large excitation cross-section. A lot of studies is focused on the Giant Dipole Resonance (GDR) and excited states known as the Pygmy Dipole Resonance (PDR). These two modes are responsible, in the wide range of γ energies, for the shape of the gamma ray strength function (γSF), which proper parameterisation is crucial for good description of the r-process in nucleosynthesis.

In recent years, more and more interest was given as well towards the Giant Quadrupole Resonance, which γ-ray decay observation has been reported only once so far. The advent of highly efficient arrays for gamma energy measurement, used in coincidence with detectors for scattered beam ions, has given a hope to conduct a systematic studies of gamma decay of this excitation. Such coincidence measurements can also be used to test the generalised Brink-Axel hypothesis, which states that γSF is independent of the energy and spin of the state on which it is built.

During the talk, a recent coincidence measurement with the use of the HECTOR and KRATTA arrays and ^{208}Pb(p,p'γ) reaction, performed at Cyclotron Centre Bronowice (CCB), will be presented along with the fresh results from other facilities. A proposal for a future experimental campaign based at CCB and Heavy Ion Laboratory, with the use of the proton beam at the former and the alpha and ^{17}O beams at the latter, will be discussed. The physical cases of the desired targets of ^{90}Zr, ^{140}Ce and ^{208}Pb will be presented. Possible upgrades of the experimental setup will be proposed, with a special stress put on importance of the use of a magnetic spectrometer in such measurements.