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# INELASTIC SCATTERING OF $^{13}\text{C}$ IONS TO GIANT RESONANCES IN $^{208}\text{Pb}$

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Over the last few years, the possibility of studying giant resonances with heavy ions has been the subject of much speculation. In this communication we report the first measurements performed at 30-MeV per nucleon.

The experiment has been conducted using 390 MeV  $^{13}\text{C}$  provided by SARA the new heavy ion facility of the ISN Grenoble. The scattered ions were detected and identified in the focal plane of the magnetic spectrometer using a combination of position, energy loss and time of flight measurements. The resolution was rather poor (1.7 MeV) and fluctuating with beam instabilities. However reasonably clean spectra could be measured on  $^{58}\text{Ni}$ ,  $^{89}\text{Y}$  and  $^{208}\text{Pb}$ , showing a broad peak in the GQR region.

The left figure shows a sample of spectra measured on the three nuclei. The peak observed in the GQR region has been unfolded in two components. The lower component has been given the experimental excitation energy and width of the GQR, whereas the upper component has been fitted to the data. The latter turns out to have the same excitation energy as the GMR and GDR in  $^{89}\text{Y}$  and  $^{208}\text{Pb}$  and a width intermediate between the values for these two modes. The results of the unfolding procedure are shown in the insets.

The right figure shows the angular distribution obtained for the GQR and the mixture of GMR + GDR found in the spectra. The cross sections are compared to calculations performed with the codes ECIS and DWIS, for the sum rule (EWSR) limit. In both cases the agreement is reasonable and the data are pretty well described by the calculations. Note that the calculations are for nuclear + coulomb excitation for the GQR (pure coulomb excitation is given by dotted line), whereas they are for nuclear excitation only for the GMR and for coulomb excitation only for the GDR. The solid line on the figure (lower) corresponds to the sum of the two contributions. It can be noticed that the investigation of the small angle region offers good multipolarity dependence of the angular distribution together with large cross sections. This opens interesting prospects for the study of the weakly excited higher modes.

