Giant dipole resonance in A $\sim$ 144 mass region

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The phenomenon of Giant dipole resonance(GDR) built on excited states in nuclei has been a subject of continuing studies by many groups, which have carried out experiments to study the dependence of temperature and angular momentum on GDR characteristics like width and strength. The multiplicity filter with high efficiency and granularity plays an important role in such experiments to untangle the effect of angular momentum and temperature at given excitation energy. We aim to perform experiments to study ^{144}Sm nuclei at different excitation energies. At Inter University Accelerator Centre (IUAC), New Delhi, we have performed an experiment to study the effect of angular momentum on GDR widths and nuclear shapes by measuring high energy gamma rays from decay of ^{144}Sm nuclei populated through the ^{28}Si+^{116}Cd reaction (Fig. 1). GDR widths are deduced from the analysis of the GDR gamma ray spectra at excitation energy of $\sim$80 MeV for different angular momenta of the compound nucleus. The exclusive measurement of GDR gamma rays was done using a 10$\times$12 inches large NaI(Tl) detector in coincidence with a 27 element NaI(Tl) multiplicity filter (sum–spin spectrometer) [4] covering $\sim$ 80% of 4π of solid angle. Maximum angular momentum spanned in the reaction is $\sim$ 54 $\hbar$. The statistical model calculations were performed using statistical model code CASCADE [5].

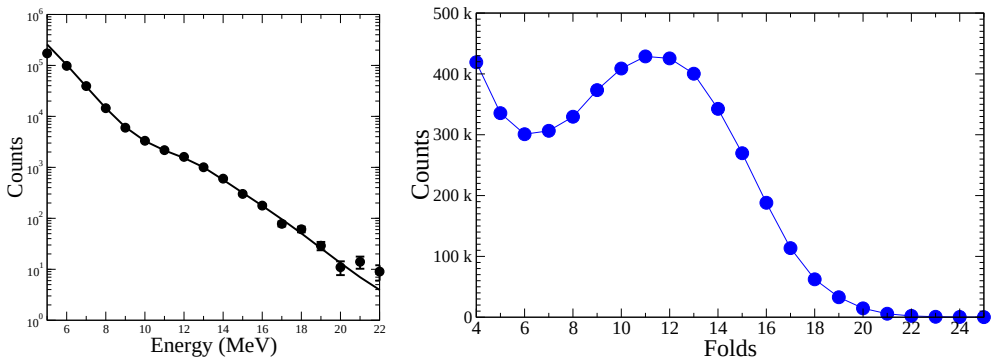

FIG. 1: Left: High energy γ–ray spectrum for fold 9-11; Right: Experimental fold distribution for the reaction ^{28}Si+^{116}Cd at 140 Mev lab. energy.

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