# Giant Dipole Resonance width at very low temperature and the critical behavior

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The influence of giant dipole resonance (GDR) induced quadrupole moment on GDR width at low temperatures has been investigated experimentally by measuring GDR width systematically in the unexplored temperature range T = 0.8–1.5 MeV, for the first time, in A ~ 100 mass region. The measured GDR widths, using alpha induced fusion reaction, for 97Tc confirm that the GDR width remains constant at the ground state value up to a critical temperature and increases sharply thereafter with increase in T . The experimental data have been compared with the adiabatic Thermal Shape Fluctuation Model (TSFM), phenomenological Critical Temperature Fluctuation Model (CTFM) and microscopic Phonon Damping Model (PDM). Interestingly, the microscopic PDM and phenomenological CTFM describe the data reasonably well, whereas the adiabatic TSFM differs substantially even after inclusion of shell effect. These interesting results indicate that the effect of GDR induced deformation could be one of the ways in explaining macroscopically the critical behavior of GDR width at low temperatures.

REFERENCES

[1] Balaram Dey et al. , Phys. Lett. B 731, 92 (2014)