4d → 4f EXCITATION IN LANTHANIDE VAPOURS

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Since the last VUV conference in Hamburg, there has been speculation on the possible occurrence of collective effects in the 4d-f excitation channels of the lanthanide sequence. However, the data available so far has been restricted to solids, with the exceptions of Barium and Europium, due to the need for a high temperature absorption cell.

In the present paper we report the first observation of the 4d-f 'Giant Resonance' for the atomic vapours of Lanthanum, Samarium and Cerium using a 42 cm long induction furnace working up to 2700 K. The spectra were calibrated by superposing the emission lines from a Garton flash tube.

The case of Lanthanum is of special interest for RPAE Theory. The occurrence of a single broad absorption peak with a rather sharp onset and a 'triangular' profile is confirmed for the Lanthanum atom. Identification of the associated discrete structure is obtained by comparison with Hartree-Fock calculations.

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