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## Alignment of atomic inner shell vacancies - A detailed study

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A lignment is accounted in terms of alignment parameter  $A_{20}$ , the fractional difference of the photo-ionization cross-sections of magnetic sub-states. The alignment of vacancies results in anisotropic distribution of X-rays originating from the filling of the vacancies as alignment is exhibited by directional correlation and polarization of characteristic X-rays and Auger electrons emitted on decay of the vacancies. Direct measurements of dependence of photo-effect on magnetic sub-states are not possible, but can be derived from the observed radioactive transitions or non-radioactive emissions. In the current work alignment studies are made for rare earth and high Z-elements using theoretical, empirical and experimental approaches. The theoretical value of alignment parameter  $A_{20}$  has been calculated by using the non-relativistic dipole approximation in a point Coulomb potential and analytical perturbation theory in a screened Coulomb potential. For empirical evaluations, IGELCS interpolated experimental LXRF cross-section values are used along with radiative decay rates. The experimental measurements have been performed in XRF laboratories of Raja Ramanna Centre for Advanced Technology (RRCAT-India) using a three dimensional double reflection set-up. The comparison of alignment studies has been found almost similar via above methods and the alignment values at the L3 threshold energy >0.1 were certainly higher (5-8%) than the earlier quoted experimental results of various groups.

## **Biography**

Ajay Sharma completed his PhD in Atomic and Radiation Physics from Nuclear Science Laboratories, Punjabi University, India. He has 15 years of teaching and research experience. His research interest includes; atomic inner shell studies and its quantum mechanical comparison for different parameters. He has a number of publications in journals of repute and a book on Alignment Studies. He is a life member of Indian Society for Atomic and Molecular Physics (ISAMP) and Indian Society for Radiation Physics (ISRP). He is also serving as Reviewer and Editorial Board Member of repute.

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