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Coster kronig transition and shake off probabilities in Lα region of X-Ray satellites spectra SURENDRA POONIA, Research Scientist (Atomic and X-Ray Spectroscopy) — The X-ray satellite spectra arising due to $2p_{3/2}^{-1}3x^{-1}$-$3x^{-1}3d^{-1}$ (x $\equiv$ s, p, d) transition array, in elements with Z = 40 to 92, have been calculated. The energies of various transitions of the array have been determined by using available Hartree-Fock-Slater data on $1s^{-1}$-$2p^{-1}3x^{-1}$ and $2p_{3/2}^{-1}$-$3x^{-1}$,$3x'^{-1}$ Auger transition energies and their relative intensities have been estimated by considering cross - sections of singly ionized $2x^{-1}$ (x $\equiv$ s, p) states and then of subsequent Coster-Kronig and shake off processes. In both these processes initial single hole creation is the prime phenomenon and electron bombardment has been the primary source of energy. The calculated spectra have been compared with the measured satellite energies in Lα_1 spectra. Their intense peaks have been identified as the observed satellite lines. The one to one correspondence between the peaks in calculated spectra and the satellites in measured spectra has been established on the basis of the agreement between the separations in the peak energies and those in the measured satellite energies. It has been established that six satellites observed in the Lα_1 region of the X-ray spectra of various elements and named α_3, α_4, α_5, $\alpha\prime$, α^{ix} and α^{x} in order of increasing energy are mainly emitted by $2p_{3/2}^{-1}3d^{-1}$-$3d^{-2}$ transitions. On the basis of agreement between computed spectra and measured satellites, It is observed that the satellite $\alpha_3$in $_{40}$Zr to $_{48}$Cd and $\alpha\prime$ in $_{74}$W to $_{92}$U is emitted by the superposition of the most intense transition $^3F_4-^3F_4$, contributing in order of decreasing intensity.

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