

SESSION 2. LOW DENSITY LABORATORY PLASMAS

X-RAY SATELLITE LINES

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Satellite lines are typical features of X-ray spectra. They correspond to radiative transitions involving an inner-shell vacancy. The most studied satellite lines are of the K_{α} - type, i.e., (1s-2p) transition.

With the advent of Space Astronomy, X-ray spectra emitted by very hot solar plasma have been obtained. By a simple comparison of different spectra, it appears that, for highly ionized atoms, some satellite lines have intensities as large as resonance lines intensities and, more particularly, this is the case for the $1s^2 n\ell - 1s2pn\ell$ satellite lines of the $1s^2 - 1s2p$ resonance lines.

The analysis of the different population mechanisms responsible for the satellite lines and resonance lines emission has shown that different spectroscopic diagnostics could be derived from line ratios only if atomic data of great accuracy were available. There exists nowadays different atomic data programs adapted to X-ray satellite lines. They have in common to give a great amount of data simultaneously : wavelengths, autoionization and radiative transition probabilities. They take into account correlation and relativistic effects.

After tackling the simple 3-electron system, the programs give now appropriate data for more complex systems but this required large computers because the lines become blended. It is therefore impossible to limit the calculation to the most intense lines.