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RECENT ADVANCES IN ATOMIC PHYSICS CODES FOR ASTROPHYSICS STUDIES

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Atomic structure codes are used to provide data for detailed spectroscopy, in view of diagnostic as well as radiative transfer in stellar and solar atmospheres. They are also used for gross spectra and average quantities such as mean charge state, Planck and Rosseland mean, non-LTE emissivity,... In the last decade, substantial improvement has been made in this domain, new theories and methods to deal with the statistics of zillion of levels and lines has been formulated. Robust, fast and user friendly codes for "extensive data production",... We shall present the codes we have initially set for laser produced plasma (and isolated ions), but which will also be used also for Astrophysical studies, with emphasis on - detailed spectroscopy (HULLAC [1]) - LTE average quantities and gross spectrum (STA[2]) - non-LTE properties (HULLAC-v9 [3], SCROLL [4]) and will propose potential applications of these codes.

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