Computation Of Atomic Transition, Ionization and Recombination Properties

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Abstract. During the past decade, the RATIP program has been developed to calculate the electronic structure and properties of atoms and ions. The design and implementation of the program is presented, and selected applications are discussed.

The RATIP program has been developed during the past years to calculate the electronic structure and properties of atoms and ions [1]. Today, these tools provide a powerful platform for studying atomic processes of open-shell atoms and ions at storage rings, ion traps as well as in plasma and intense radiation fields, including photo excitation, ionization and Auger processes. Although the main focus in developing these tools has been paid on processes with just one electron in the continuum, recent emphasis was placed also on second-order processes as well as those properties for which different types of (many-electron) amplitudes need to be combined in order explain complex spectra. Here, I present and discuss the present capabilities of the RATIP tools of which a major part now became public [2]. Recent applications of the code refer to the radiative [3] and di-electronic recombination [4] as well as the Coulomb excitation of multiple and highly charged ions [5].

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