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DOUBLY-EXCITED ATOMS AND THE LINE BROADENING

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Atomic systems with doubly-excited electrons have been the objects of extensive studies in the last fifteen years. These autoionizing states may be longlived metastable atoms, with a number of properties peculiar to those systems where interelectron correlations play crucial role, and the independent-particle picture fails even as a zero-order approximation.

We shall expound principal mechanisms for forming such states, quote essential features of the two-electron excited states and the most common ways for their decays. Particular attention will be paid to the methods for evaluating energy spectra, especially quantum mechanical and semiclassical approaches for calculating line positions and widths. Possible modes of radiative transitions will be enumerated and a number of mechanisms of line broadening shall be discussed. Some prospective developments in the line broadening theory will be outlined.