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Boundary Solutions of the Two-electron Schrödinger Equation at Two-particle Coalescences of the Atomic Systems MIRON AMUSIA, Racah Institute of Physics, The Hebrew University, Jerusalem 91904, Israel; A.F. Ioffe Physical-Technical Institute, St. Petersburg, 194021, Russia, EVGENY LIVERTS, Racah Institute of Physics, The Hebrew University, Jerusalem 91904, Israel, RAJMUND KRIVEC, Department of Theoretical Physics, J. Stefan Institute, P.O. Box 3000, 1001 Ljubljana, Slovenia, VICTOR MANDELZWEIG, Racah Institute of Physics, The Hebrew University, Jerusalem 91904, Israel, PHYSHUJI TEAM — The limit relations for the partial derivatives of the two-electron atomic wave functions at the two-particle coalescence lines have been obtained numerically using accurate CFHHM wave functions. The asymptotic solutions of the proper two-electron Schrödinger equation have been derived for both electron-nucleus and electron-electron coalescence. It is shown that the solutions for the electron-nucleus coalescence correspond to the ground and singly excited bound states, including triplet ones. The proper solutions at small distances R from the triple coalescence point were presented as the second order expansion on R and $\ln R$. The vanishing of the Fock's logarithmic terms at the electron-nucleus coalescence line was revealed in the frame of this expansion, unlike the case of electron-electron coalescence. On the basis of the obtained boundary solutions the approximate wave function corresponding to both coalescence lines have been proposed in the two-exponential form with no variational parameters.

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