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Two charges on plane in magnetic field ADRIAN ESCOBAR-RUIZ, ALEXANDER TURBINER, Instituto de Ciencias Nucleares, National University of Mexico (UNAM) — Two Coulomb charges on a plane subject to a constant magnetic field B perpendicular to the plane are considered. Major emphasis is given to three particular cases: the Hydrogen atom, the Positronium and two electrons (quantum dot), at zero pseudo-momentum. It is shown that in addition to global integrals, pseudo-momentum and angular momentum, a particular integral appears for a certain values of magnetic field. The particular integral implies the existence of closed trajectories (in classical case) and polynomial eigenfunctions (in quantum case). Combining for the phase of wavefunction the WKB expansion at large distances and the perturbation theory at small distances a compact uniform approximation for lowest eigenfunctions is constructed. For the lowest states at magnetic quantum numbers $s = 0, 1, 2$ this approximation gives not less than 7 s.d., 8 s.d., 9 s.d. for the total energy $E(B)$ for magnetic fields 0.049 a.u. $<$ B $<$ 2000 a.u. (Hydrogen atom), 0.0125 a.u. $<$ B $<$ 500.6 a.u. (Positronium) and 0.025 a.u. $\leq$ B $\leq$ 1000 a.u. (two electrons), respectively. In framework of convergent perturbation theory the corrections to proposed approximations are evaluated.

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