Optical Spectra of Shallow Donors in Uniform Magnetic and Electric Field

Adam J. Zakrzewski\textsuperscript{1,2}

\textsuperscript{1}Department of Mathematics and Natural Sciences College of Science, Cardinal Stefan Wyszyński University, ul. Dewajtis 5, 01-815 Warsaw, Poland
\textsuperscript{2}Institute of Physics, Polish Academy of Sciences, Al. Lotnikow 32/46, 02-668 Warsaw, Poland

This work reports on recent progress in developing robust and accurate computational procedure for description of optical spectra of shallow donors in uniform magnetic field within effective mass approximation. Computations with a new variational basis yields unprecedented accuracy, which can be compared only to the results obtained with the use of power series [1, 2]. However, our method is computationally much simpler than that of Ref. [2]. Moreover, in contrast to the power series method central cell corrections and anisotropy of effective mass and/or dielectric constant can be easily taken into account. Finally, quasibound states of shallow donors in uniform electric field are calculated.