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G-factors of hole bound states in spherically symmetric potentials in cubic semiconductors

Holes in cubic semiconductors have effective spin 3/2 and as a result they have very strong spin orbit interaction as compared with that of electrons. High spin 3/2 provides the complex kinematic structure in coupling between spin and momentum. The strength/complexity creates a variety of new opportunities for spintronics, semiconductors' based artificial topological materials, quantum point contacts and other spin related effects/applications.

In the present study we develop a new technique and then calculate analytically Lande factors of hole bound states in arbitrary spherically symmetric confining potentials.
Previously, this problem for a special case of acceptor states was addressed numerically and a very strong suppression of g-factors was noted \cite{Schmitt}. The origin of this suppression was not understood. Our analysis explains the suppression and, more importantly, allows to make predictions for arbitrary bound states which can be used in spintronics applications.

\begin{thebibliography}{10}
\bibitem{Schmitt} W. O. G. Schmitt, E. Bangert, G. Landwehr, \emph{J. Phys. Condens. Matter} {\bf 3} (1991).
\end{thebibliography}

Primary author(s) : Mr MISEREV, Dmitry (UNSW, Sydney, Australia)

Co-author(s) : Mr SUSHKOV, Oleg (UNSW, Sydney, Australia)

Presenter(s) : Mr MISEREV, Dmitry (UNSW, Sydney, Australia)