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Few-body bound states near free-space p-wave resonances in the presence of single-particle spin-orbit coupling terms[1] D. BLUME, Q. GUAN, Washington State University — Ultracold atom systems provide unique opportunities for studying extremely weakly-bound two- and few-body states. Theoretically, many aspects of such bound states have been explored successfully using zero-range s-wave contact interactions. Experimentally, bound state spectra have been deduced using radio-frequency spectroscopy. This work considers weakly-bound two- and few-body states in the vicinity of two-body free-space p-wave scattering resonances in the presence of spin-orbit coupling. While it has been shown previously that the single-particle spin-orbit coupling terms have a profound effect on the two- and three-body bound state energies for s-wave interacting systems, the interplay between two-body p-wave interactions and single-particle spin-orbit coupling terms is much less studied. This contribution discusses our implementation of the explicitly correlated Gaussian basis set expansion approach and the dependence of the resulting two- and few-body energy spectra on the free-space scattering volume, the two-body effective range, and the spin-orbit coupling parameters such as the Raman coupling strength and the detuning.

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