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Spin-orbit decomposition of ab initio nuclear wavefunctions[1]
CALVIN JOHNSON, San Diego State University — Although the modern shell-model picture of atomic nuclei is built from single-particle orbitgs with good total angular momentum j leading to j-j coupling schemes, phenomenological models decades ago suggested for $0p$ nuclei a simpler picture can be realized by coupling of total orbital angular momentum L and total spin S. I revisit this idea with large-basis, no-core shell model (NCSM) calculations using modern *ab initio* two-body interactions and dissect the resulting NCSM wavefunctions into their L- and S-components. Remarkably, despite a gap of nearly fifty years and six orders of magnitude in the basis dimension, there is broad agreement between NCSM and phenomenological wavefunctions computed with the Cohen-Kurath force.

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