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**Interactions and valley-orbit coupling in Si quantum dots** LUYAO JIANG, ICQD, University of Science and Technology of China, C. H. YANG, University of New South Wales, ZHAODI PAN, ICQD, University of Science and Technology of China, ANDREA MORELLO, ANDREW DZURAK, University of New South Wales, DIMITRIE CULCER, ICQD, University of Science and Technology of China — The valley-orbit coupling in a few-electron Si quantum dot is a function of its occupation number N, and for N >1 is in principle renormalized by the electron-electron Coulomb interaction, which is known to be strong. We study the interaction renormalization of the valley-orbit coupling for $2 \leq N \leq 4$, showing that, counter-intuitively, interaction effects on the valley-orbit coupling are weak. For $N = 2$ the renormalization is suppressed by valley interference, while for $N = 3$ all renormalization terms are zero due to spinor overlaps, and for $N = 4$ interaction renormalization terms cancel between different pairs of electrons. Experimental observations reveal no evidence of interaction effects on the valley-orbit coupling, consistent with these findings.

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