Abstract Submitted
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Theoretical study of the strain-induced nuclear spin depolarization in self-assembled quantum dots[1] CHIA-WEI HUANG, XUEDONG HU, Department of Physics, University of Buffalo, SUNY Buffalo, NY 14260-1500 — We investigate how strain-induced quadrupole interaction is related to nuclear spin polarization in self-assembled quantum dots. Our calculation shows that the achievable nuclear spin polarization in $In_xGa_{1-x}As$ quantum dots is sensitively dependent on the strain distribution in the dots. There are two interesting regions of rapid changes in nuclear spin polarization when the Overhauser field is in the opposite direction to the external field. The first one occurs in the low field region (B < 1T) where nuclear spin polarization of individual nuclear species is suppressed due to a degeneracy between different nuclear spin states. The second one is a peak in nuclear spin polarization showing up in the intermediate field region. This peak corresponds to a local maximum of the Overhauser field, which happens when electronic Zeeman energy vanishes. Our results are in qualitatively agreement with the measured nuclear spin polarization in the experimental work of various groups[2, 3, 4]

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[2]B. Eble *et al.*, Phys. Rev. B **74**, 081306 (2006).
[3]A. S. Bracker *et al.*, Phys. Rev. Lett. **94**, 047402 (2005).
[4]P. Maletinsky *et al.*, Phys. Rev. B **75**, 035409 (2007).

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