

Objective:

- Explain experimentally observed dot-to-dot variations in the dephasing times, T_2^* in Si QDs.

Approach:

- Atomistic spin-orbit interaction (SOI) + interface steps.

Results:

- Interface steps:

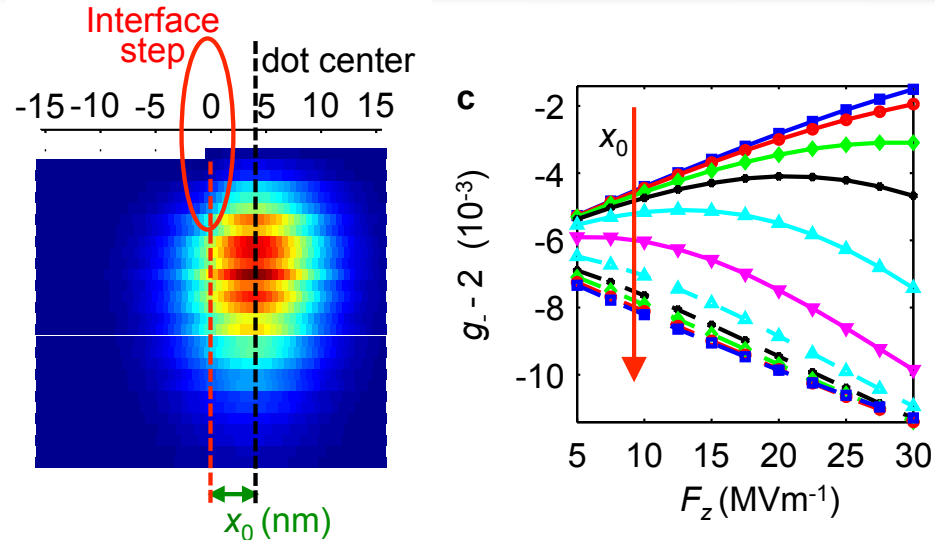
variation in stark shift (g vs F_z),

- Charge noise (δF_z) cause dephasing

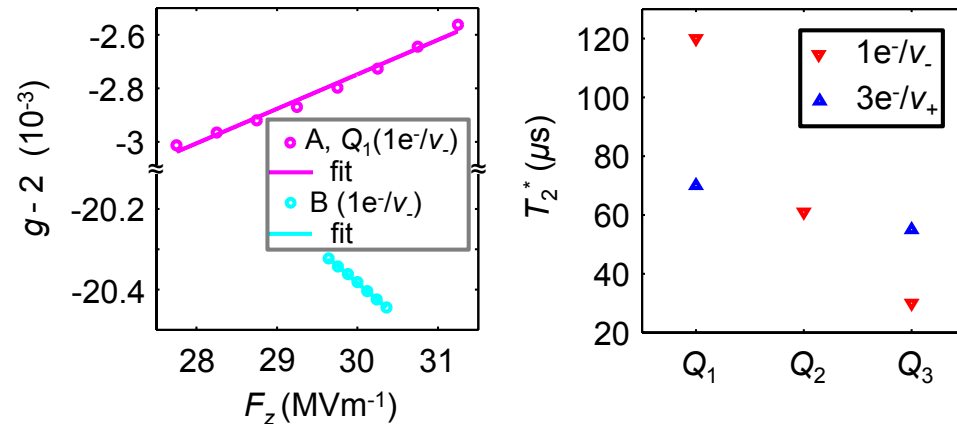
$$T_2^* = \frac{\sqrt{2}\hbar}{\delta F_z \left| \frac{dg}{dF_z} \right| \mu_B B_{\text{ext}}}$$

Impact:

- Predicted and experimentally observed dot-to-dot variation in T_2^* Si/SiO₂ QDs.



Theoretically predicted variation



Experimentally observed variation