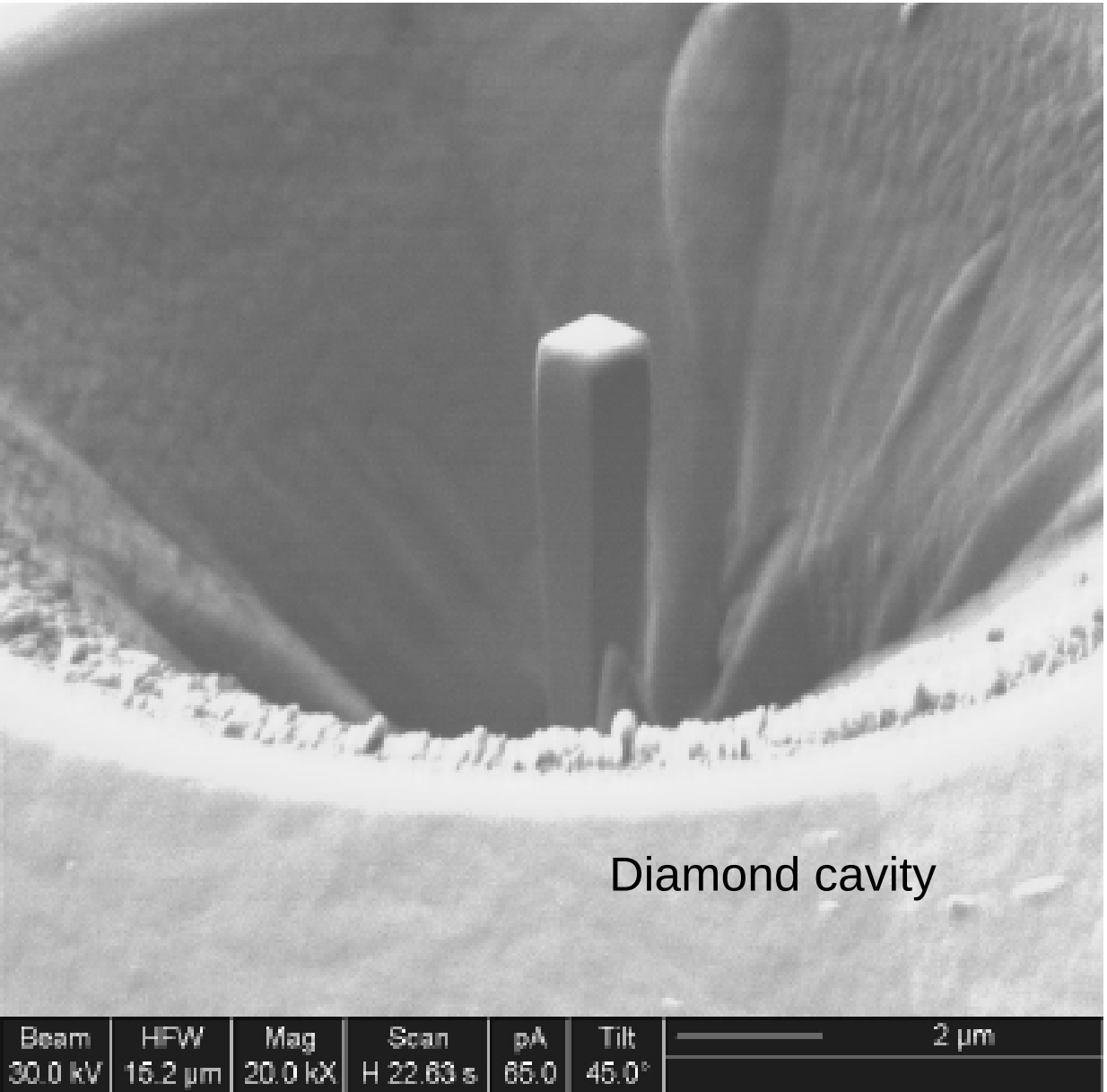
Quantum phase transitions with NV damonds

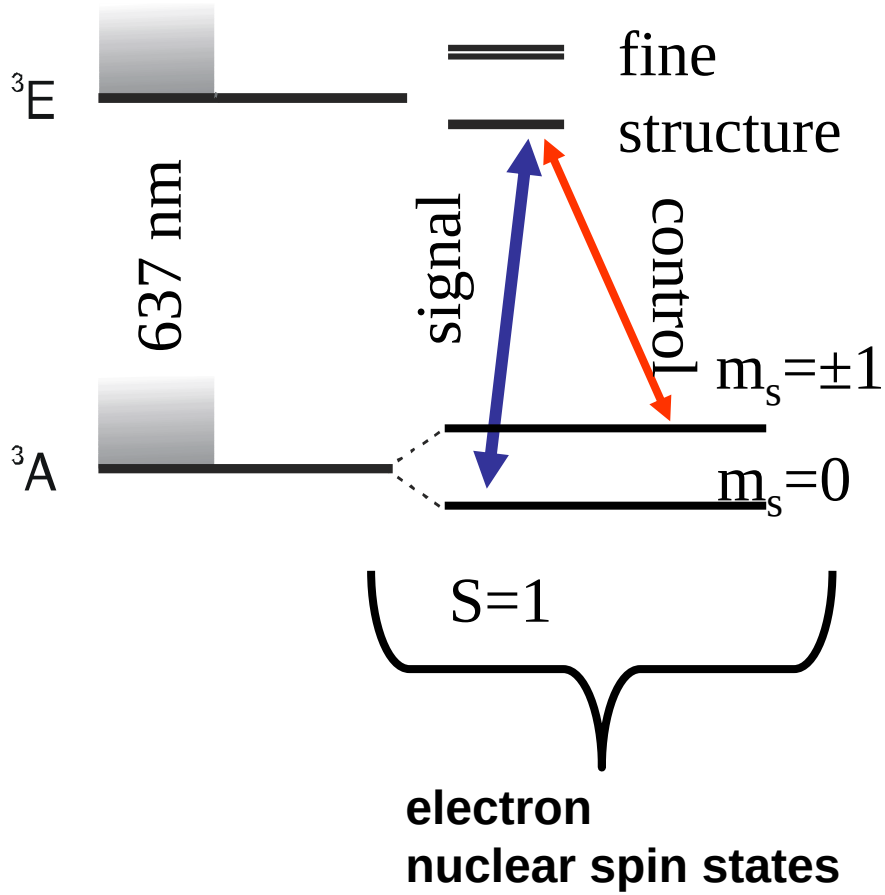


J. Rarity (Bristol)
S. Prawer (Melbourne)

EQUIND

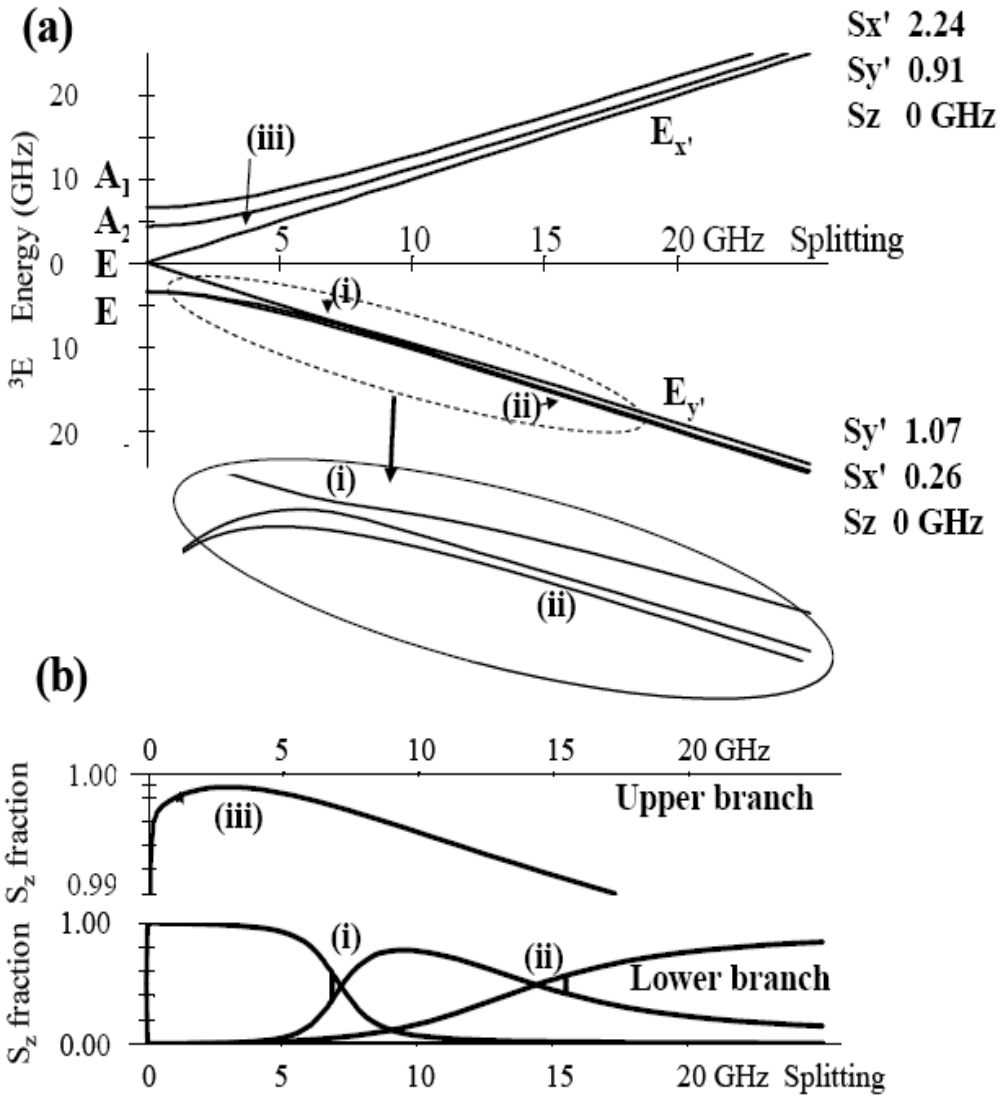
P. Olivero
Advanced materials (2005)

Dark-state polaritons with NV diamond



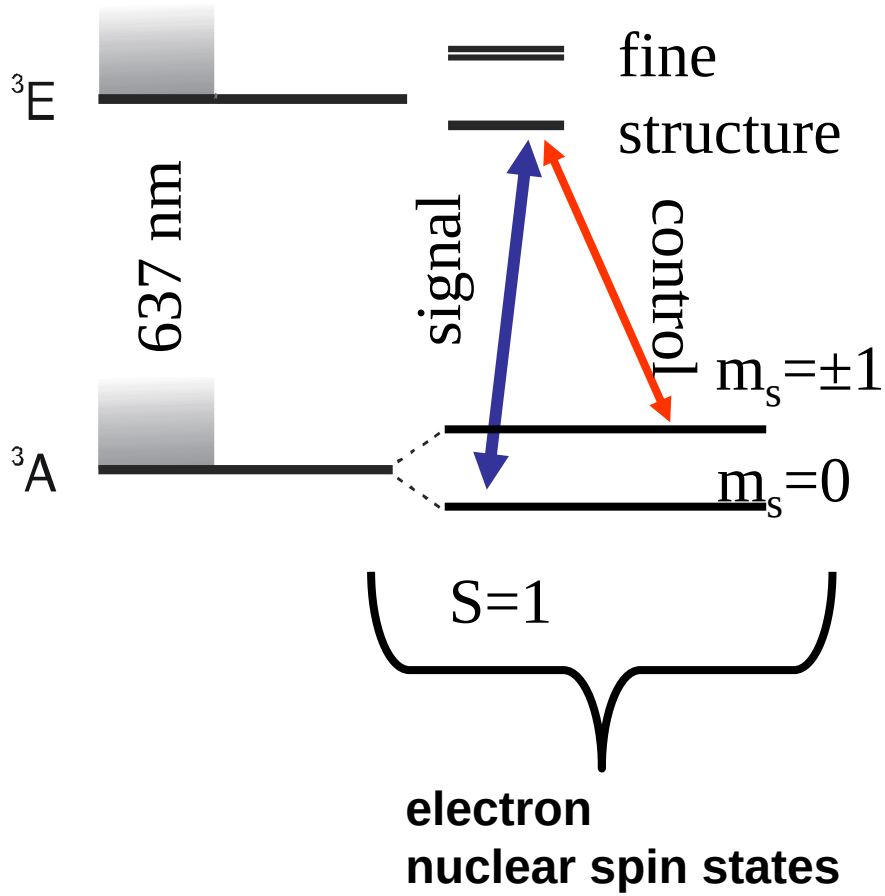
Excited State Structure of NV center

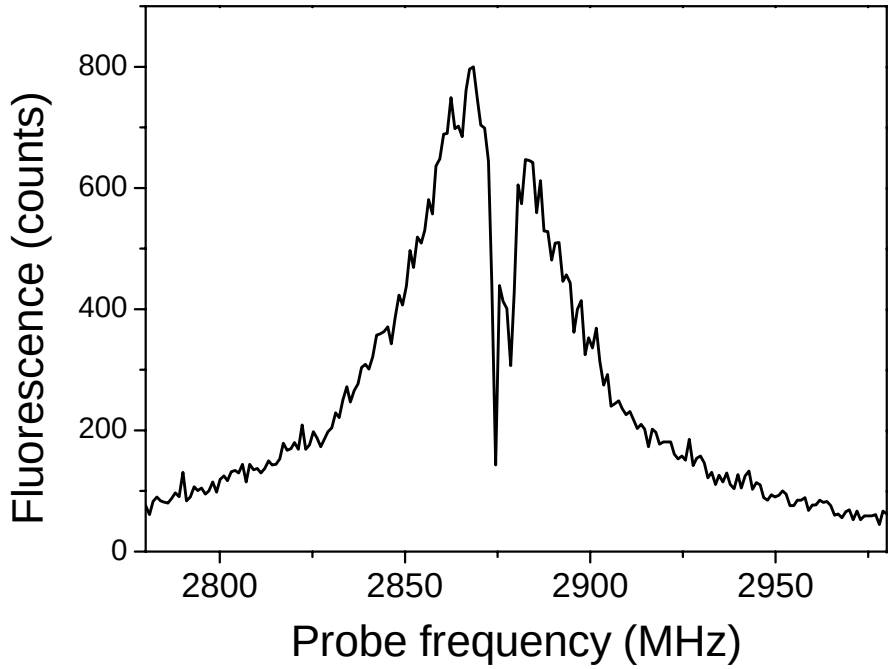
$$H = H_0 + H_{so} + H_{elec} + H_{str}$$



P. Tamarat et al. submitted

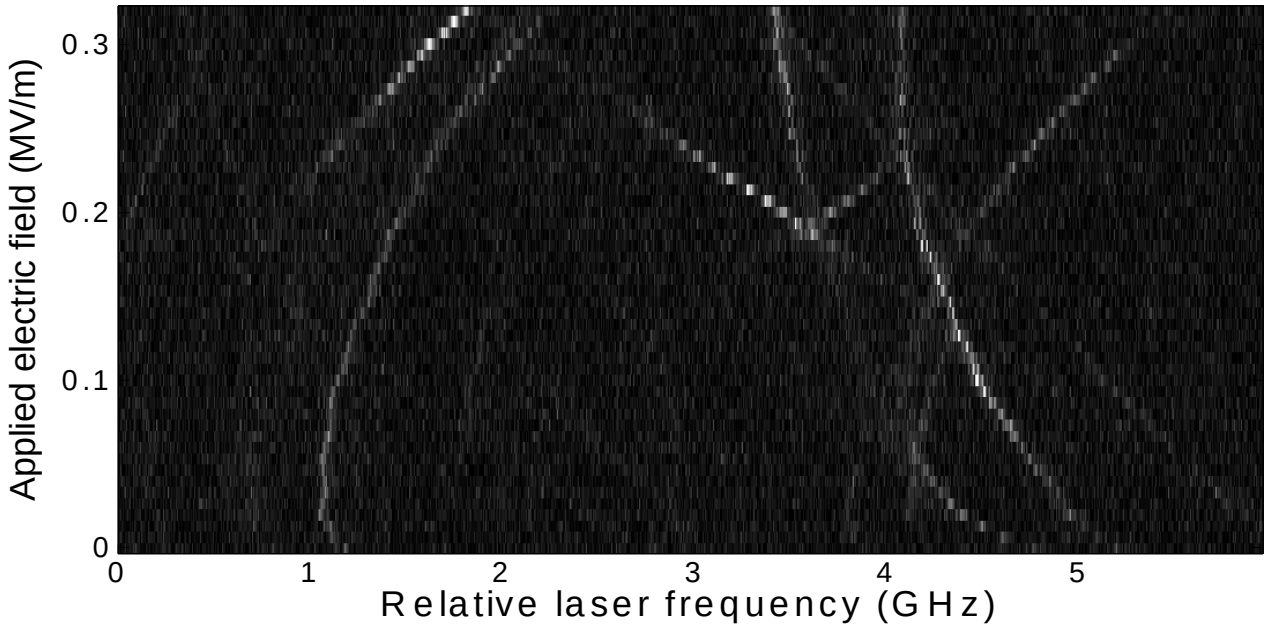
Dark-state polaritons with NV diamond





Santori et al.
Phys. Rev. Lett. **97**, 247401 (2006)

Electrical tuning of NV transitions



Tamarat P. et al., PRL (2006)

Simulation of a quantum phase transition for two-spin NMR

D. Suter PRA 71, 012307 (2005)

System: two spins coupled by Ising interaction

$$H = \omega_z \left(\sigma_z^1 + \sigma_z^2 \right) + J \sigma_z^1 \sigma_z^2$$

dimensionless field strength $g = \frac{\omega_z}{J}$

The ground state of the system:

$$\left| \uparrow\uparrow \right\rangle \text{ for } g_z < -1$$

$$\Psi^+ \quad \text{for } -1 < g_z < 1$$

$$\left| \downarrow\downarrow \right\rangle \text{ for } g_z > 1$$