Dipole-dipole coupling Hamiltonian :

$$\mathcal{H}_{dd} \approx -\frac{\mu_0}{4\pi r^3}\vec{\mu_1}\cdot\vec{\mu_2} \quad \propto \frac{\hat{\vec{S}}_1\cdot\hat{\vec{S}}_2}{r^3}$$

NV$^-$

Spin 2

$|m_s=-1\rangle$

γ_{las}

$\frac{1}{T_1}$

$\frac{1}{T_1}$

$|m_s=0\rangle$

NV$^-$

Spin 2

$|m_s=-1\rangle$

γ_{las}

$\frac{1}{T_1}$

Spin quanta exchange
"Flip-Flop"

$\frac{1}{T_1}$

$|m_s=0\rangle$

Tuning $\vec{B}$

Initially : non-resonant coupling $\longrightarrow$ Resonant coupling : NV depolarization