

$$\begin{aligned}
\hat{H} &= \hbar[D(\hat{S}_z^2 - \frac{2}{3}I_3) + E(\hat{S}_x^2 - \hat{S}_y^2) + \gamma_{nv}\vec{B} \cdot \hat{S}] \\
\Delta E_{[m_s=+1]} &= +g_e\mu_B |\vec{B} \cdot \hat{u}| \\
\Delta E_{[m_s=-1]} &= -g_e\mu_B |\vec{B} \cdot \hat{u}| \\
\Delta E_{[m_s=0]} &= 0 \\
\hat{H} &= \hbar[D(\hat{S}_z^2 - \frac{2}{3}I_3) + \gamma_{nv}B_z\hat{S}_z] \\
m_s &= +1 \\
m_s &= -1 \\
\Delta\nu_i &= \nu_{i[+1]} - \nu_{i[-1]} \\
B_i &= \Delta\nu_i/\gamma_{nv}
\end{aligned}$$

$$\begin{cases} \Delta\nu_i = \nu_{i[+1]} - \nu_{i[-1]} \\ B_i = \Delta\nu_i/2\gamma_{nv} \end{cases} \quad (1)$$

$$[\hat{u}_1, \hat{u}_2, \hat{u}_3, \hat{u}_4]; [-1, -1, 1, 1]$$

$$\begin{cases} \vec{B} \cdot \hat{u}_{list}[i]_1 = B_1 \\ \vec{B} \cdot \hat{u}_{list}[i]_2 = B_2 \\ \vec{B} \cdot \hat{u}_{list}[i]_3 = B_3 \end{cases} \quad (2)$$

$$\begin{cases} \vec{B} \cdot \hat{u}_1 = B_i \\ \vec{B} \cdot \hat{u}_2 = B_i \\ \vec{B} \cdot \hat{u}_3 = B_i \end{cases} \quad (3)$$

$$\vec{B} \cdot \hat{u}_{list}[i]_4 = B_4$$

$$NV^0$$

$$NV^-$$

$$\theta_1 = 109.5^\circ/2 = 54.75^\circ$$

$$\theta_2 = 180^\circ - 54.75^\circ = 125.5^\circ$$

Calculated			Hall	
B_x [mT]	B_y [mT]	B_z [mT]	B_x [mT]	B_z [mT]
0.27 ± 0.17	0.00 ± 0.17	0.00 ± 0.17	0.27 ± 0.01	0.13 ± 0.1
0.29 ± 0.19	0.00 ± 0.19	0.00 ± 0.19	0.28 ± 0.01	0.15 ± 0.01
0.31 ± 0.17	0.00 ± 0.17	0.00 ± 0.17	0.30 ± 0.01	0.17 ± 0.01
0.33 ± 0.16	0.00 ± 0.16	0.00 ± 0.16	0.30 ± 0.01	0.14 ± 0.01
0.36 ± 0.32	0.00 ± 0.32	0.00 ± 0.32	0.32 ± 0.02	0.11 ± 0.01
0.39 ± 0.33	0.00 ± 0.33	0.00 ± 0.33	0.38 ± 0.02	0.21 ± 0.01
0.59 ± 0.32	0.00 ± 0.32	0.00 ± 0.32	0.58 ± 0.03	0.21 ± 0.01
0.79 ± 0.28	0.00 ± 0.28	0.00 ± 0.28	0.80 ± 0.04	0.30 ± 0.01
1.04 ± 0.33	0.00 ± 0.33	0.00 ± 0.33	0.90 ± 0.04	0.30 ± 0.01
1.16 ± 0.33	0.00 ± 0.33	0.00 ± 0.33	1.10 ± 0.06	0.22 ± 0.01

Calculated			Hall	
B_x [mT]	B_y [mT]	B_z [mT]	B_x [mT]	B_z [mT]
3.60 ± 0.18	0.58 ± 0.19	-1.78 ± 0.18	3.50 ± 0.17	-1.70 ± 0.09
4.00 ± 0.18	0.70 ± 0.20	-2.43 ± 0.19	4.10 ± 0.20	-2.40 ± 0.12
5.42 ± 0.18	0.56 ± 0.17	-3.08 ± 0.17	5.30 ± 0.27	-3.00 ± 0.15
8.01 ± 0.19	1.09 ± 0.18	-3.33 ± 0.18	7.80 ± 0.39	-3.40 ± 0.17
8.53 ± 0.15	0.79 ± 0.16	-4.62 ± 0.15	8.00 ± 0.40	-4.70 ± 0.23
9.95 ± 0.17	0.66 ± 0.20	-5.85 ± 0.19	9.90 ± 0.49	-5.70 ± 0.28
12.01 ± 0.15	0.68 ± 0.16	-9.12 ± 0.17	11.70 ± 0.58	-9.00 ± 0.45