

I. $k \cdot p$ HAMILTONIAN

A. Hamiltonian

$$H_{11}^{kp} = a_1 + a_2 + c_1 (k_x^2 + k_y^2) + c_2 (k_x^2 + k_y^2) + c_4 k_z^2 + c_5 k_z^2 \quad (1)$$

$$H_{12}^{kp} = c_3 \left(\left(1 - \frac{\sqrt{3}i}{3} \right) k_x k_z + \left(-\frac{\sqrt{3}}{3} - i \right) k_y k_z \right) \quad (2)$$

$$H_{22}^{kp} = a_1 - a_2 + c_1 (k_x^2 + k_y^2) + c_2 (-k_x^2 - k_y^2) + c_4 k_z^2 - c_5 k_z^2 \quad (3)$$

B. Parameters

$$\begin{aligned} a_1 &= -1.9225; \\ a_2 &= -0.1072; \\ c_1 &= -3.8327; \\ c_2 &= 0.5985; \\ c_3 &= -0.0525; \\ c_4 &= 0.8931; \\ c_5 &= 0.0188; \end{aligned}$$

II. ZEEMAN'S COUPLING

A. Hamiltonian

$$H_{11}^Z/(\mu_B/2) = g_2 B_z + g_3 B_z \quad (4)$$

$$H_{12}^Z/(\mu_B/2) = g_1 \left(\left(1 - \frac{\sqrt{3}i}{3} \right) B_x + \left(-\frac{\sqrt{3}}{3} - i \right) B_y \right) \quad (5)$$

$$H_{22}^Z/(\mu_B/2) = g_2 B_z - g_3 B_z \quad (6)$$

B. Parameters

$$\begin{aligned} g_1 &= -1.9336; \\ g_2 &= -6.829; \\ g_3 &= 2.3372; \end{aligned}$$