$I_1 = I$

$I_2 = I - 2$

$\hbar\omega = \frac{1}{2}\left(E_{I_1} - E_{I_2}\right)$

$$\left.\begin{aligned} E^{th}_{I_1} &= E^{exp}_{I_1} + \delta_{I_1} \\ E^{th}_{I_2} &= E^{exp}_{I_2} + \delta_{I_2} \end{aligned}\right\}, \quad \delta_{I_1} \neq \delta_{I_2}$$

$$\hbar\omega^{(exp)} = \frac{1}{2}\left(E^{exp}_{I_1} - E^{exp}_{I_2}\right) = \frac{1}{2}\Delta^{exp}_{12}$$

$$\hbar\omega^{(th)} = \frac{1}{2}\left(E^{th}_{I_1} - E^{th}_{I_2}\right) = \underbrace{\frac{1}{2}\Delta^{exp}_{12}}_{\hbar\omega^{(exp)}} + \underbrace{\frac{1}{2}\left(\delta_{I_1} - \delta_{I_2}\right)}_{\neq 0}$$

$$\Rightarrow \quad \boxed{\hbar\omega^{(th)} = \hbar\omega^{(exp)} + \frac{1}{2}\left(\delta_{I_1} - \delta_{I_2}\right)}$$

The average δ_I for each band			
TSD1	TSD2	TSD3	TSD4
-0.000598406	0.000181717	0.00629519	0.0294064