

Multipole moment

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1 Spherical multipole moments of a point chagre

Firest Section ui

$$\left(\begin{array}{l} \text{position} = \left(\begin{array}{ccc} 0 & 0 & 0 \\ \frac{a}{\sqrt{3}} & \frac{\pi}{2} & 0 \\ \frac{a}{\sqrt{3}} & \frac{\pi}{2} & \frac{2\pi}{3} \\ \frac{a}{\sqrt{3}} & \frac{\pi}{2} & \frac{4\pi}{3} \end{array}\right); \end{array}\right) (\text{charge} = \{-3q, q, q, q\};) (\text{QQ} = \text{Simplify}[\text{Table}[Q(L, m), \{L, 0, 2\}, \{m,$$

(1)

$$\frac{e^{\frac{i\phi}{2}}\sqrt{\sin(\theta)}\sqrt[4]{\cos(\theta)+1}\left(2\cos^2(\theta)-1\right)}{\sqrt{2}\pi\sqrt{\frac{1}{2}(\cos(\theta)-1)+1}\sqrt[4]{1-\cos(\theta)}\sqrt[4]{1-\cos^2(\theta)}}\quad (2)$$

$$N\left[Y_{\frac{1}{2}}^{\frac{1}{2}}\left(\frac{\pi}{7},\frac{\pi}{3}\right),30\right]\quad (3)$$