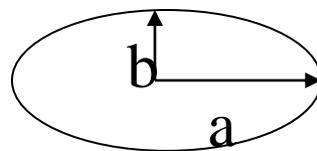
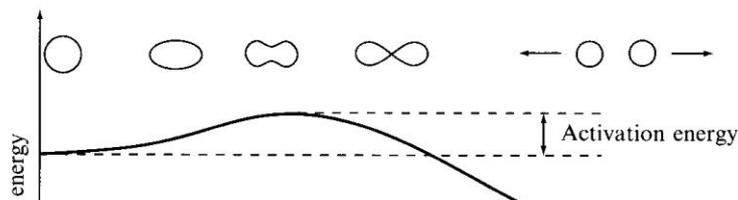


集団振動



$$a = R \cdot (1 + \epsilon)$$

$$b = R \cdot (1 + \epsilon)^{-1/2}$$

一般的に, $R(\theta, \phi) = R_0 \left(1 + \sum_{\lambda, \mu} \alpha_{\lambda\mu} Y_{\lambda\mu}^* \right)$

$$V = \frac{1}{2} \sum_{\lambda, \mu} C_{\lambda} |\alpha_{\lambda\mu}|^2$$



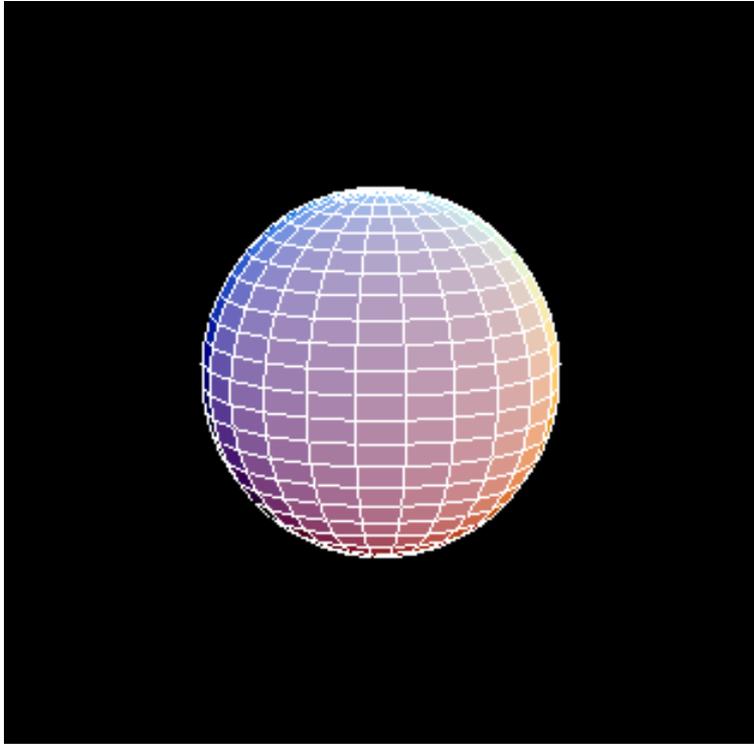
量子化: 調和振動子

(note) 慣性能率

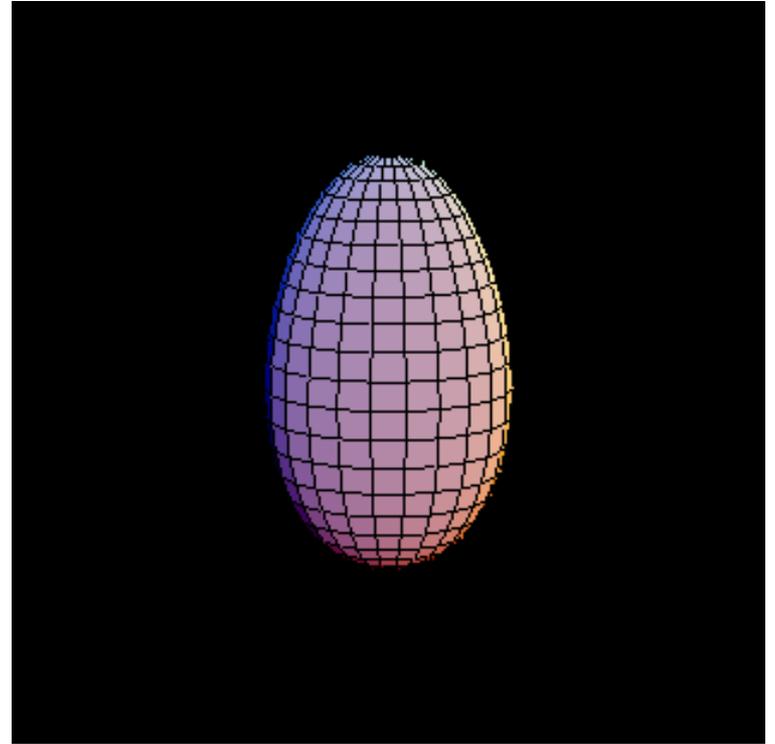
← 非圧縮性渦なし流体

$$R(\theta, \phi) = R_0 \left(1 + \sum_{\lambda, \mu} \alpha_{\lambda\mu} Y_{\lambda\mu}^* \right)$$

$$V = \frac{1}{2} \sum_{\lambda, \mu} C_{\lambda} |\alpha_{\lambda\mu}|^2$$



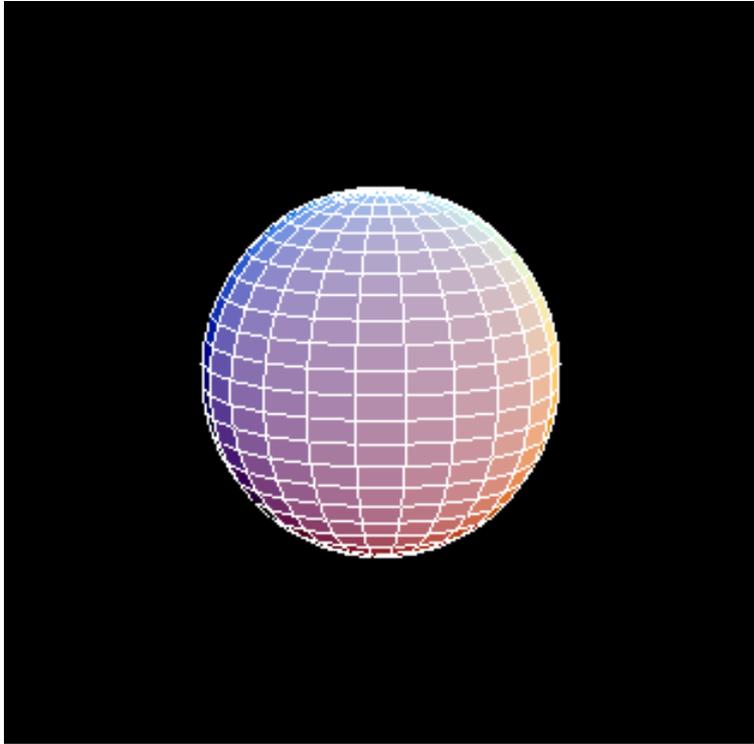
$\lambda=2$: 四重極型振動



$\lambda=3$: 八重極型振動

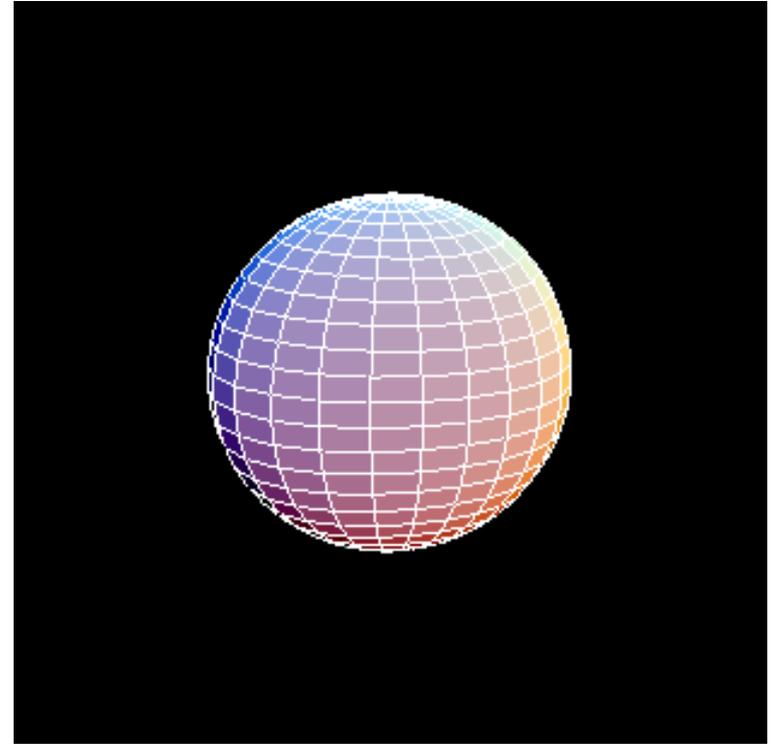
$$R(\theta, \phi) = R_0 \left(1 + \sum_{\lambda, \mu} \alpha_{\lambda\mu} Y_{\lambda\mu}^* \right)$$

$$V = \frac{1}{2} \sum_{\lambda, \mu} C_{\lambda} |\alpha_{\lambda\mu}|^2$$



Y_{20} 型振動

$$\lambda=2, \mu=0$$

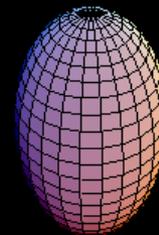
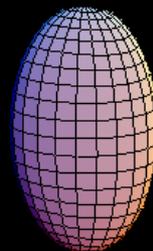
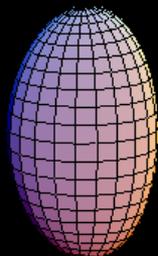


Y_{22} 型振動

$$\lambda=2, \mu = +/- 2$$

$$R(\theta, \phi) = R_0 \left(1 + \sum_{\lambda, \mu} \alpha_{\lambda\mu} Y_{\lambda\mu}^* \right)$$

$$V = \frac{1}{2} \sum_{\lambda, \mu} C_{\lambda} |\alpha_{\lambda\mu}|^2$$



Y_{30} 型振動

Y_{31} 型振動

Y_{32} 型振動

Y_{33} 型振動

$\lambda=3, \mu=0$

$\lambda=3, \mu = +/- 1$

$\lambda=3, \mu = +/- 2$

$\lambda=3, \mu = +/- 3$

どのくらいのエネルギーを与えれば原子核は振動しはじめるのか？

↔ 振動の励起エネルギー

ムービー: 在田謙一郎氏 (名古屋工大)

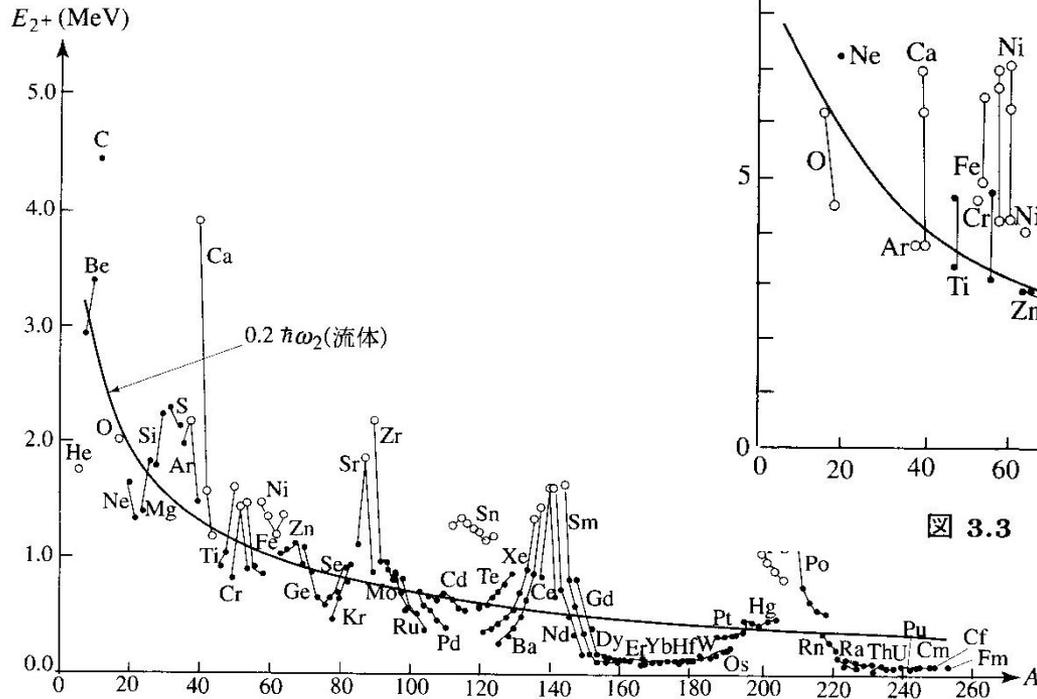


図 3.2 偶々核の第 1 励起 2+ 状態の励起エネルギー

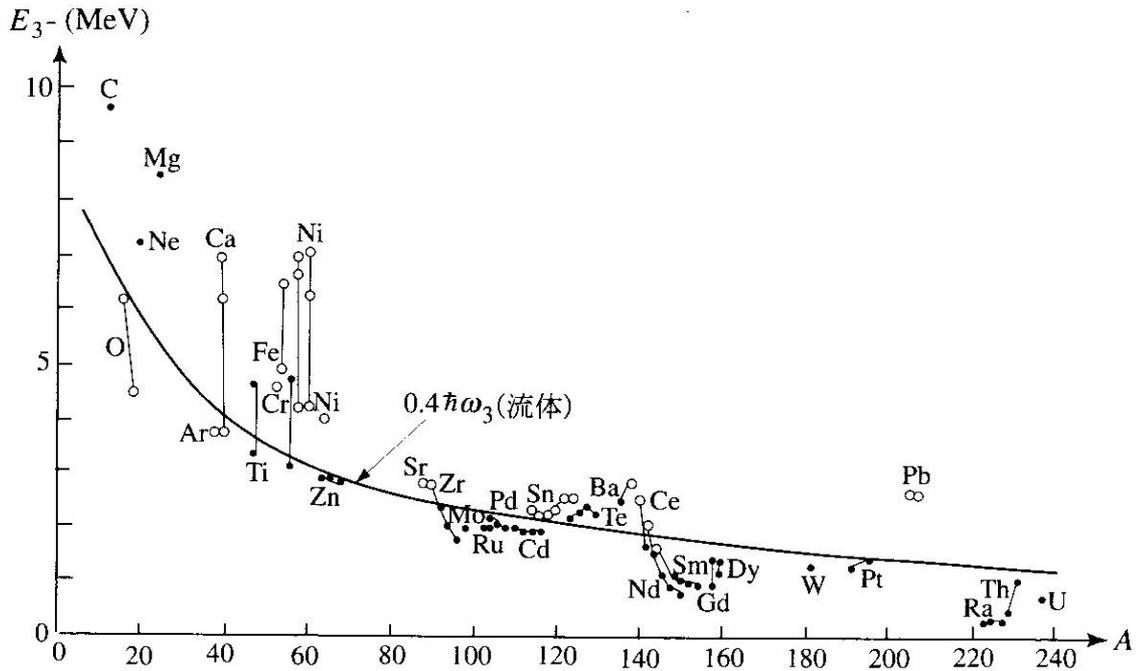


図 3.3 偶々核の第 1 励起 3- 状態の励起エネルギー

2重フォノン状態

4+ ————— 1.282 MeV
 2+ ————— 1.208 MeV
 0+ ————— 1.133 MeV

2+ ————— 0.558 MeV

0+ —————

^{114}Cd