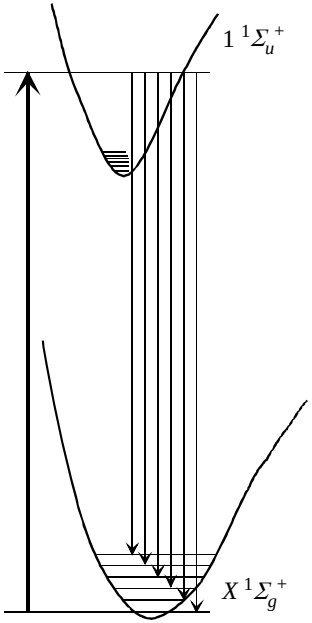
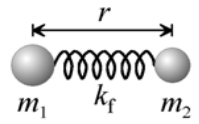
3.1

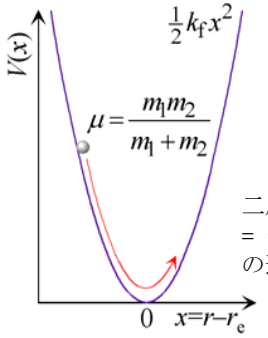
Cl_2 励起状態の発光スペクトル



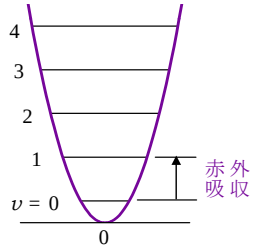
出典: J. Wörmer *et al.*, *Z. Phys.* **D7**, 383 (1988).



調和振動子モデル



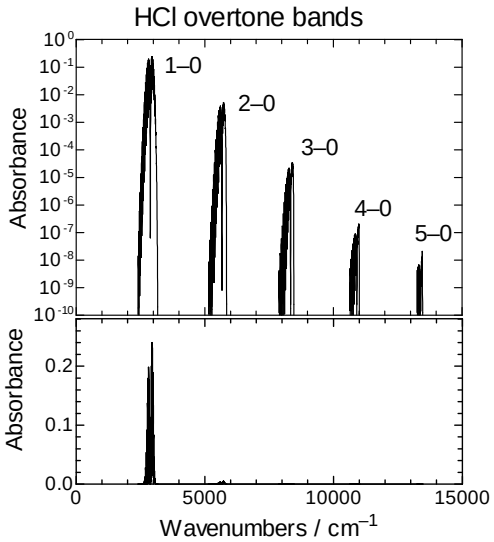
二原子分子の振動 = 質量 μ の粒子の運動

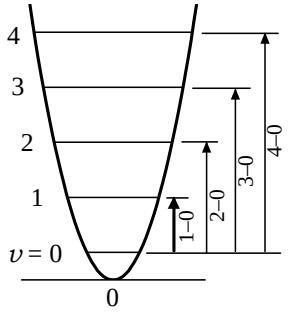


調和振動子のエネルギー準位

3.2

HCl の倍音バンド





3.3

二原子分子の赤外吸収 cm^{-1} (μm)

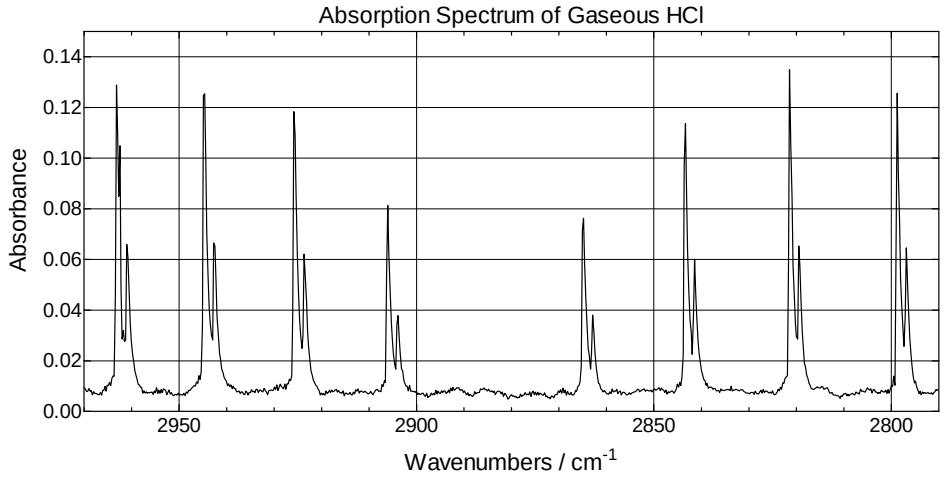
HCl	2886 (3.47)
NO	1876 (5.33)
CO	2143 (4.67)

ばね定数 k_f と結合次数 n, 結合解離エネルギー D

	k_f / N m^{-1}	n	D / kJ mol^{-1}
HBr	384	1	366
Cl_2	318	1	243
O_2	1139	2	498
NO	1548	2.5	632
CO	1855	3	1076
N_2	2241	3	945

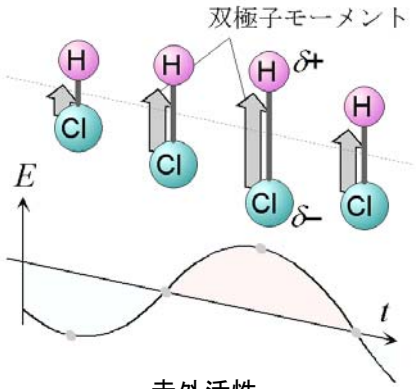
3.4

$H^{35}Cl$ と $H^{37}Cl$ の赤外吸収スペクトル

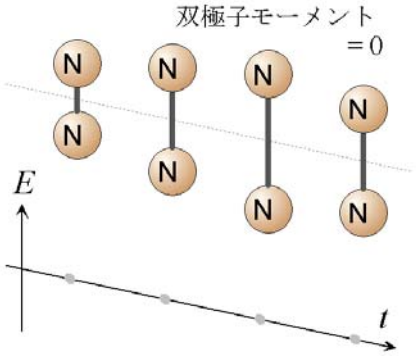


4.1 赤外(光学)遷移の古典的解釈

赤外(光学)遷移
= 双極子による遷移



赤外活性

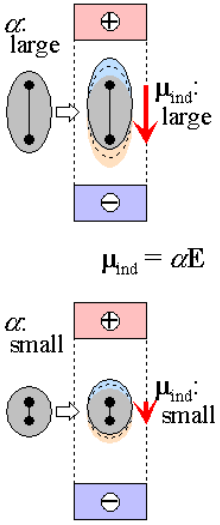


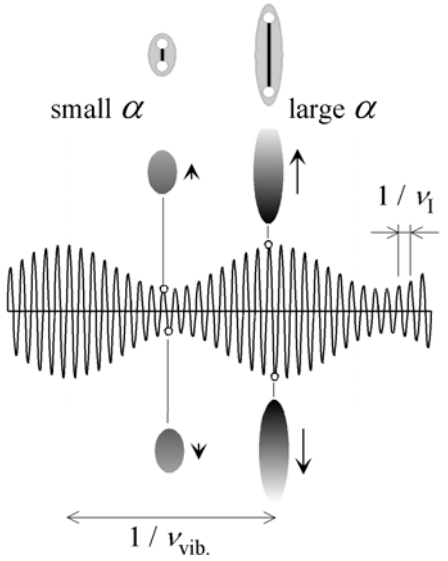
赤外不活性

4.2 ラマン散乱の古典的解釈

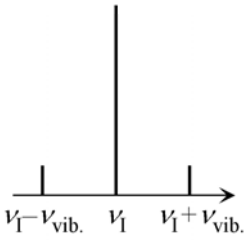
ラマン散乱 = 分極率による遷移

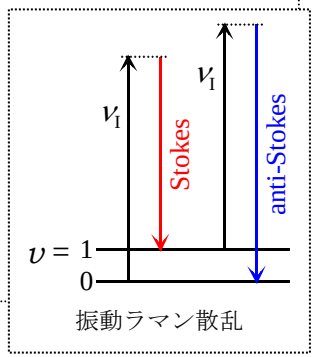
分極率



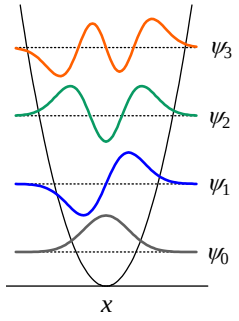


フーリエ変換

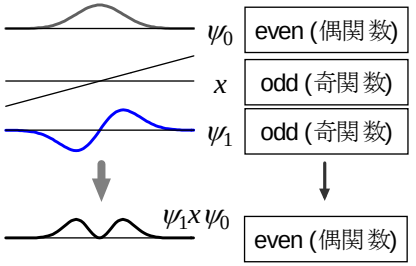




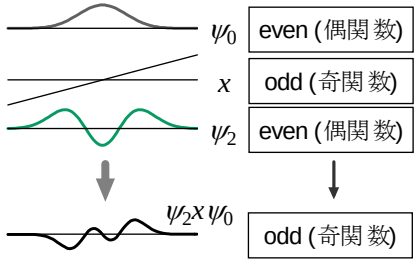
振動ラマン散乱



振動波動関数
(調和振動子)



(*a*) 許容遷移 ($\upsilon = 1 \leftrightarrow 0$)



(*b*) 禁制遷移 ($\upsilon = 2 \leftrightarrow 0$)