absorbed. The lines with higher frequency are obtained and these lines are called "Anti-stokes lines."

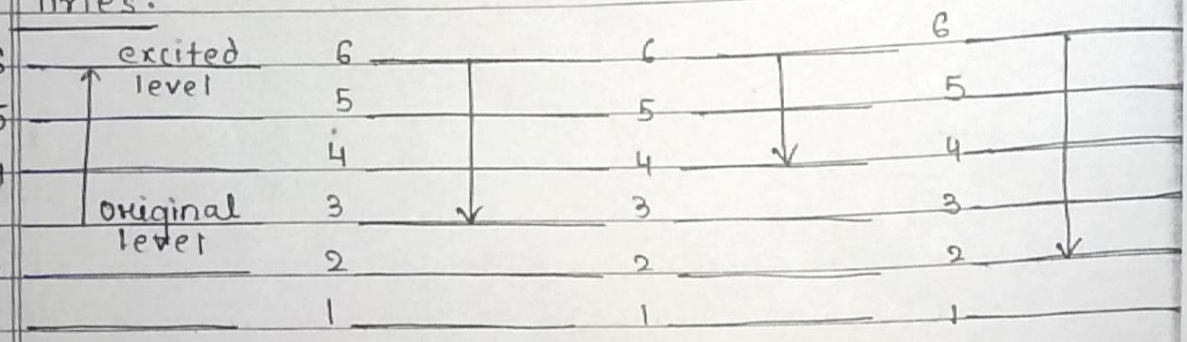

Fig: Energy absorbed by the molecule | Rayleigh Scattering | Formation of stokes line | Formation of anti-stokes lines

Raman observed that the difference between the frequency of the incident light & that of a particular scattered line was constant depending only upon the nature of the substance being irradiated and was completely independent of the frequency of the incident light. If ν_i is the frequency of the incident light and ν_s is the frequency of scattered light, the difference in frequency $\Delta\nu$ is called Raman frequency or Raman shift.

$$\Delta\nu = \nu_i - \nu_s$$

Raman Spectra

- In case of H_2O all three vibrations are Raman as well as IR-active.
- In CO_2 two modes of vibrations are IR-active only one Raman active & one de-generate.

Raman Spectra

C.V Raman observed that when a substance in the gaseous, soln, liquid ~~of~~ solid state is irradiated with monochromatic light of definate frequency (ν) the light scattered at right angles to the incident light content lines not only of the incident frequency but also of lower frequency & sometimes of higher frequency.

When a photon strikes the molecule, the energy is absorbed by the molecule & it gets excited to some higher energy level. If it returns to the original level, it will emit the same energy as absorbed. The line ~~with~~ obtained in the spectra is called Rayleigh line or Rayleig Scattering. In most of the cases the excited molecules does not return to the original level. It may return to a level higher than the original level thereby emitting energy less than absorbed. Thus lines with lower frequency are obtained. These lines are called Stokes line. If the excited molecules return to lower than the original level more energy is emitted than

Thus, the Raman frequency observed for a particular substance are characteristic of that substance. The various observations made by Raman are called Raman effect & the spectrum observed is called Raman spectrum. Raman spectrum is represented as follows :-

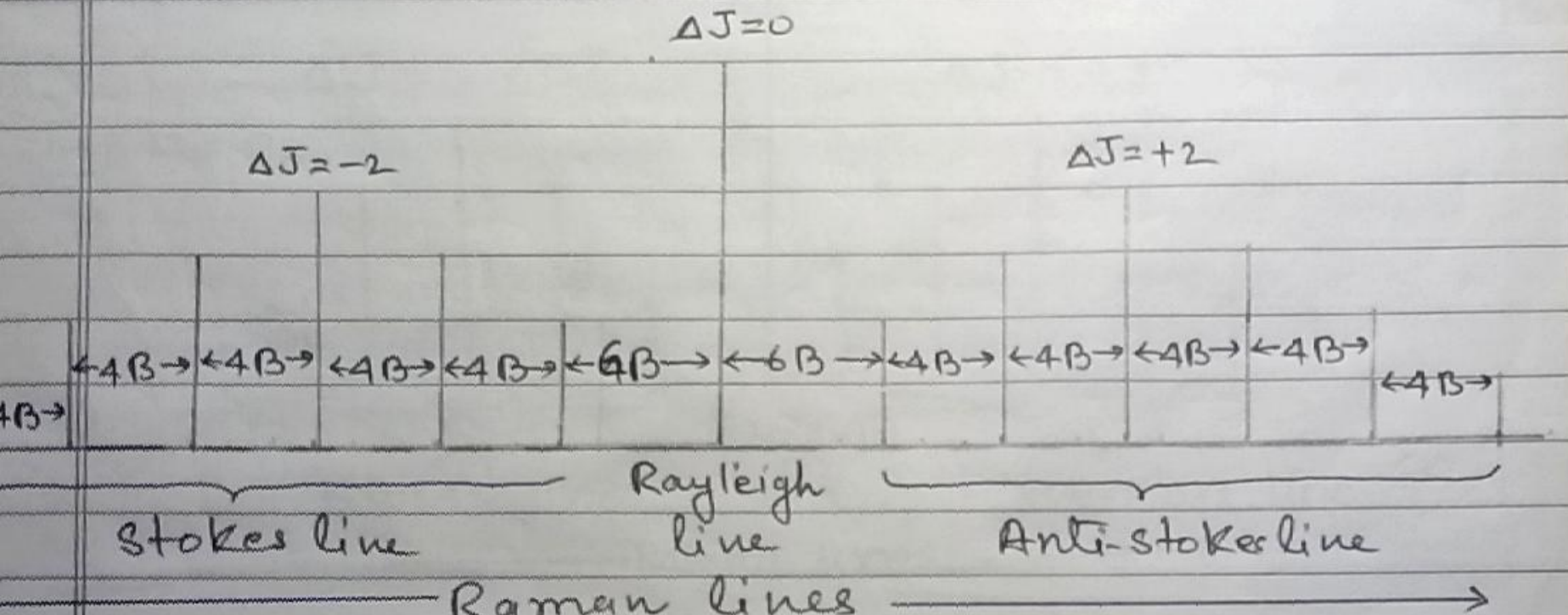

Fig: Simplified representation of Raman spectrum