Quantum Rotational Dynamics of CH_3I

Group D

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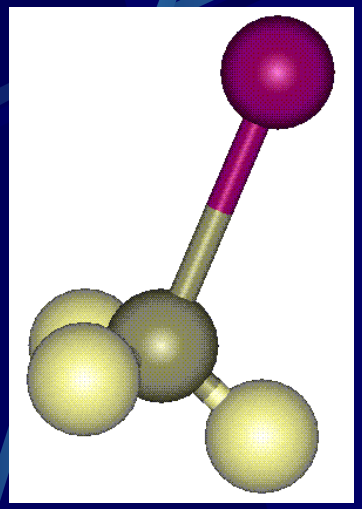
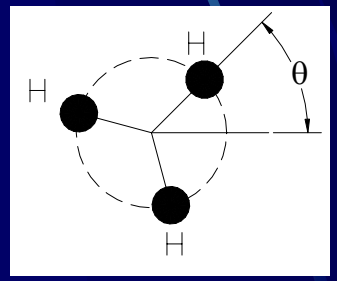
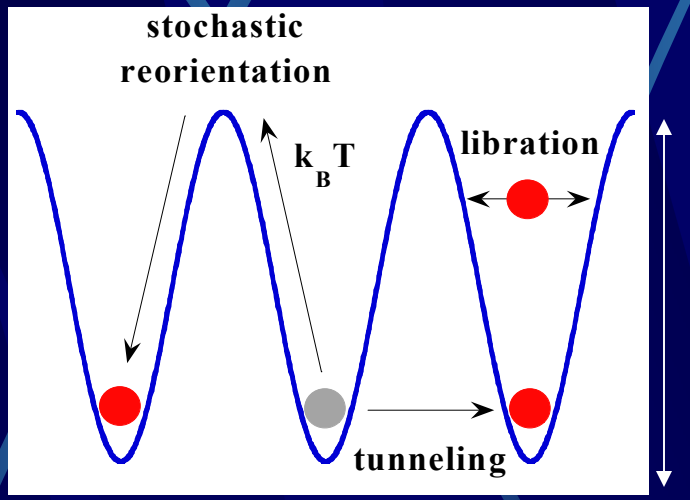
System description





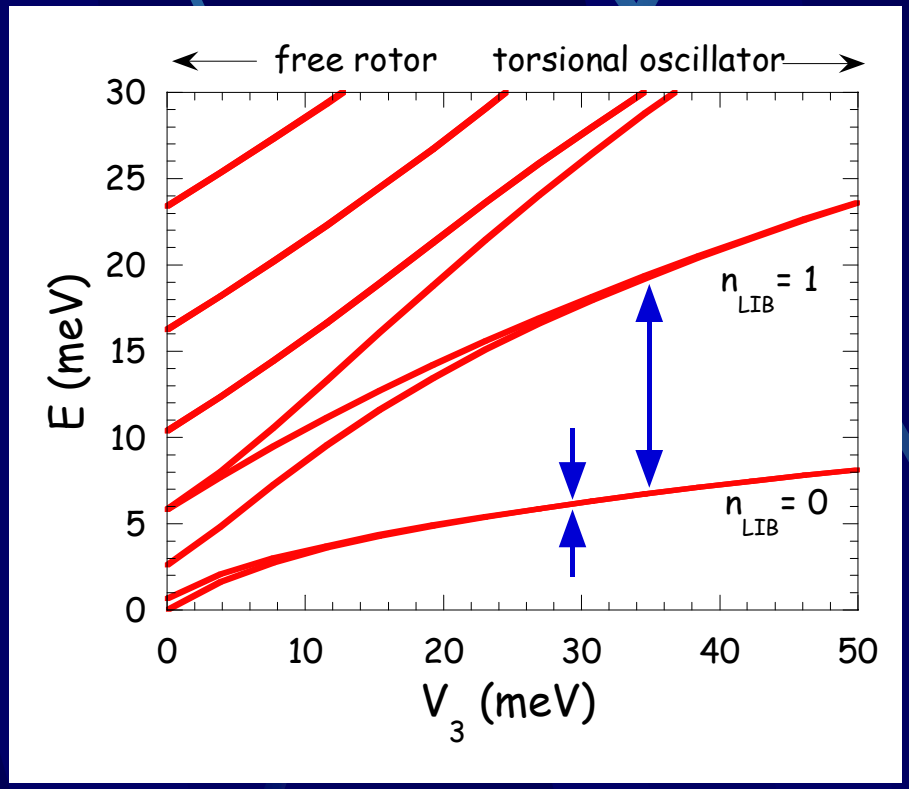


Methyl Iodide

Three fold potential model

$$V(\theta) = \frac{V_3}{2}(1 - \cos 3\theta)$$

Numerical Values of Energy Level



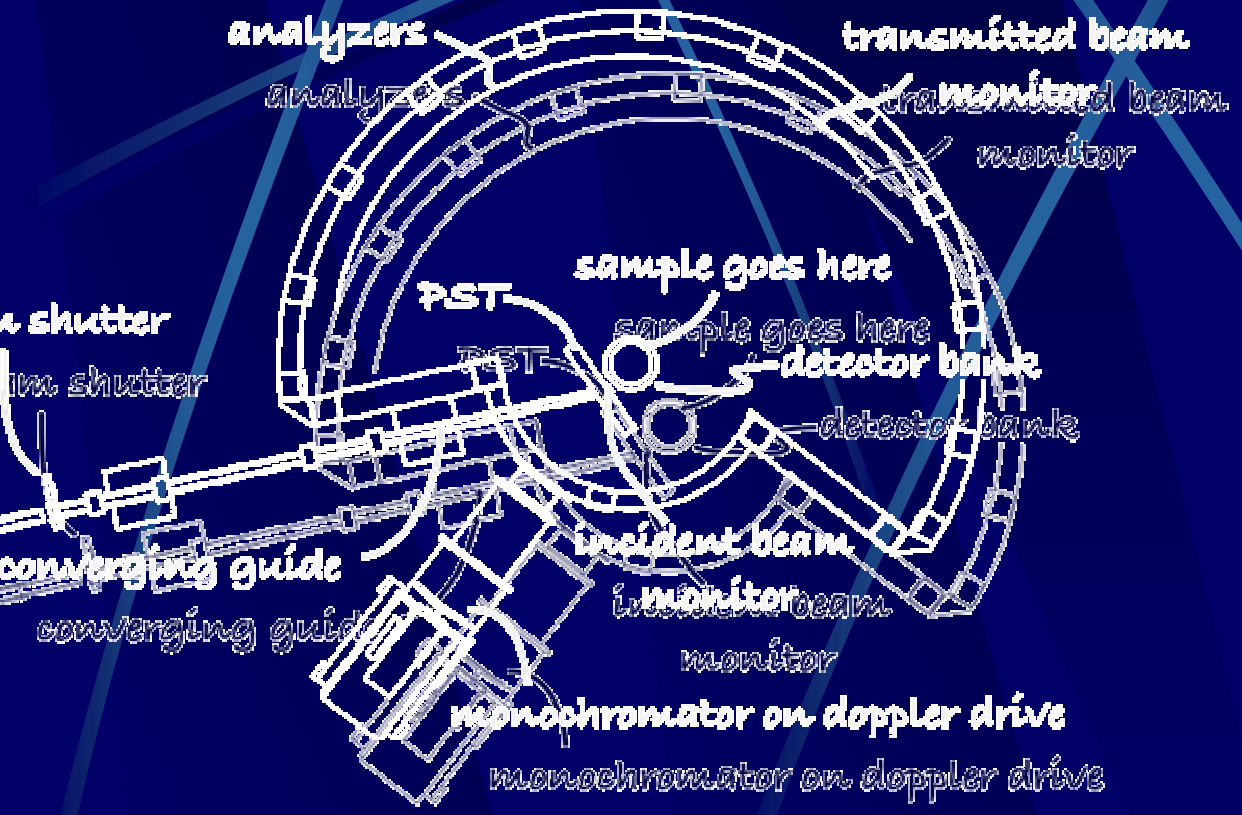
Experimental Goals

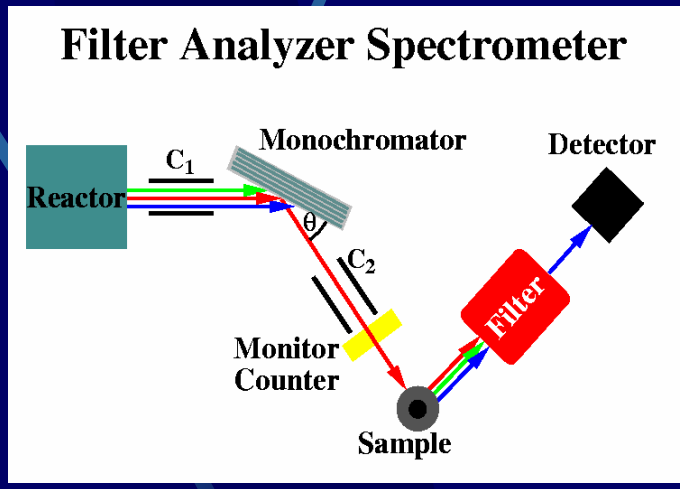
- What we are looking for:
  1. The “height”of the V3 well
  2. The librational energy
  3. The projected radius of Hydrogen from Carbon

Why HFBS and FANS?

- The tunneling energy is quite small
  - Tunneling process have energies on order of ~ μeV
- The HFBS has high resolution.

  ~1 μeV, well below the conventional triple-axis and neutron TOF spectrometers.
- The FANS has high energy transfer (~100meV)


analyzers
transmitted beam monitor
sample goes here
PST
detector bank
shutter
converging guide
incident beam monitor
monochromator on doppler drive


Filter Analyzer Spectrometer
Reactor
C1
Monochromator
Detector
θ
C2
Filter
Monitor
Counter
Sample