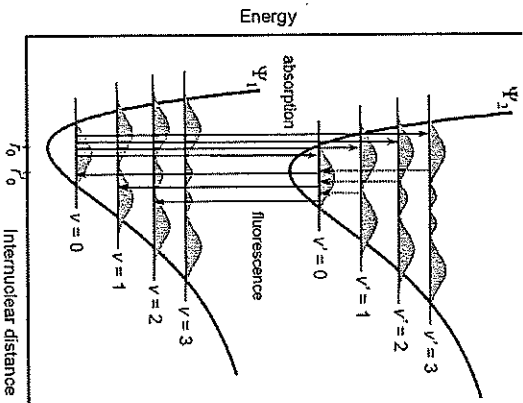


Absorption & Fluorescence



- Absorption and emission $\sim |\mu_{12}|^2$
- Absorption and emission are mirror images
- Vibronic progression

Transition dipole moment:

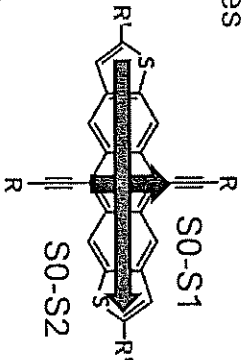
Absorption

Emission

Electronic part

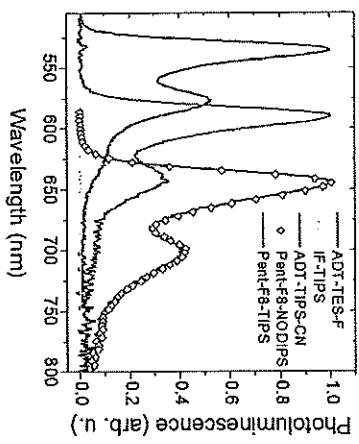
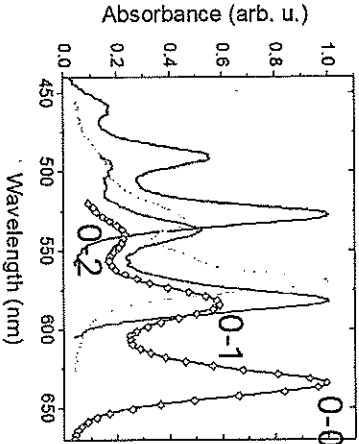
Nuclear part

$$\Psi(\mathbf{r}; \mathbf{R}) = \psi(\mathbf{r}) \chi(\mathbf{R})$$



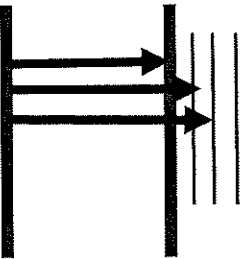
$$\mu_{12} = \int \chi_{2v}^* \chi_{10} d\mathbf{R} \int \psi_2^* \mu \psi_1 d\mathbf{r}$$

$$\mu_{21} = \int \chi_{1v}^* \chi_{20} d\mathbf{R} \int \psi_1^* \mu \psi_2 d\mathbf{r}$$

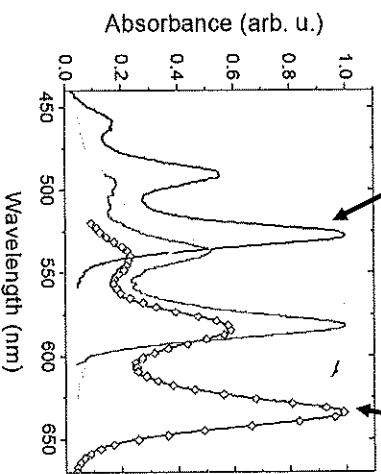
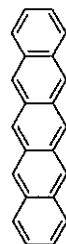
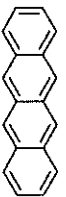




Light absorption



- Need molecules with conjugated core (alternating single/double bonds)
- Electron delocalized over the molecule
- Size of the conjugated core = size of the box
- Larger molecule = lower energies = longer wavelengths



• Optical absorption spectroscopy

