

## Questions concerning the reduction/simplification of the “Grand” T.D.S.E.

- 1) Under what conditions does the separation of time ( $t$ ) leading to  $\psi(t) = \exp(-iEt/\hbar)$  hold?
- 2) In what common experimental situation is this separation not valid?
- 3) What types of spectroscopy involve the wave function  $\psi(R_N)$  explicitly?
- 4) What is the justification for using the separation of variables technique to write the electronic wavefunction as a product of space and spin, i.e.,  $\psi(r_i; R_N) \chi(s_i)$ ?
- 5) What interaction (present in the absence of an external magnetic field) leads to the breakdown of the approximation in (4)?
- 6) What types of spectroscopy directly involve the spin eigenfunctions  $\chi(s_i)$  and  $\chi(s_N)$  where

$$\psi(r_i, s_i, R_N, s_N, t) = \psi_e(r_i; R_N) \chi(s_i) \chi(s_N) \exp(-iEt/\hbar)?$$