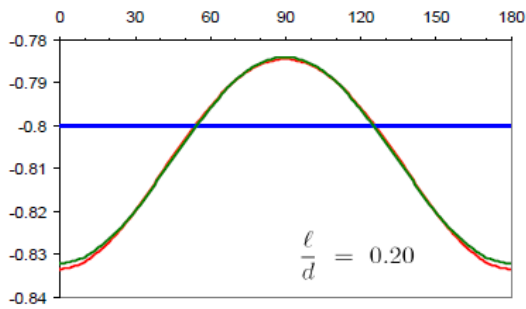


nuclear quadrupole interaction: from toy model to quantum

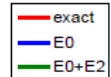
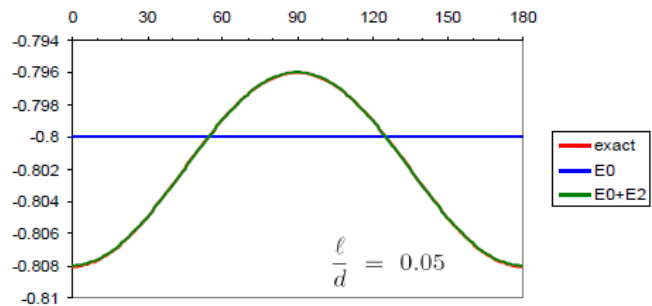
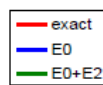
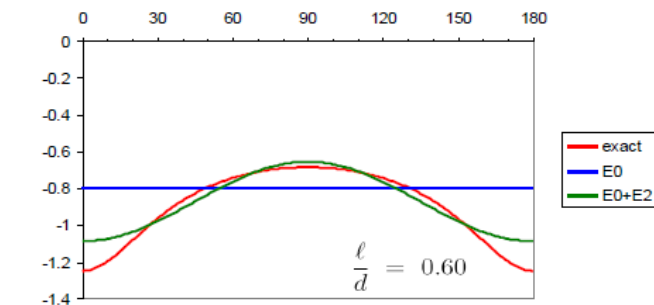
The multipole expansion rapidly converges if $r_n/r_e \ll 1$.

Toy problem: if $l \ll d$



If l becomes smaller w.r.t. d , then

- the quadrupole term becomes a better approximation
- the absolute value of the quadrupole term becomes smaller



The three pictures on this slide illustrate that the truncation after the quadrupole term becomes better when the nucleus becomes smaller w.r.t. the electron cloud. However, one aspect of these three pictures might be misleading. Inspect the vertical axis. What can you conclude about the size of the quadrupole term itself if the nucleus becomes smaller ?