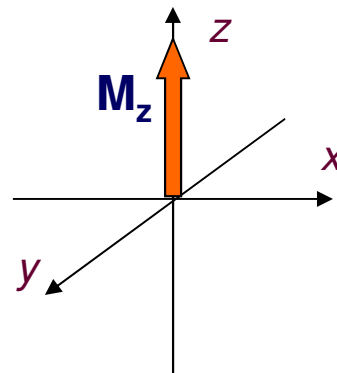

NMR Spektroskopie

Lekce 7: Relaxace

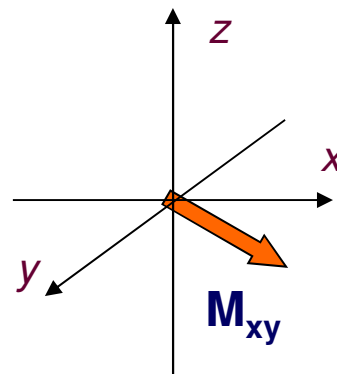


Martin Dračinský

Rovnovážný stav

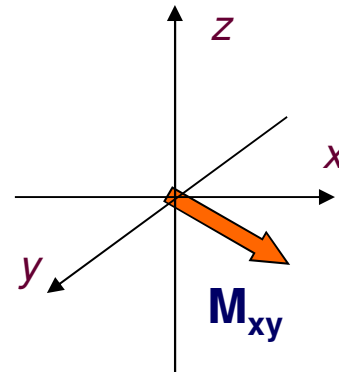
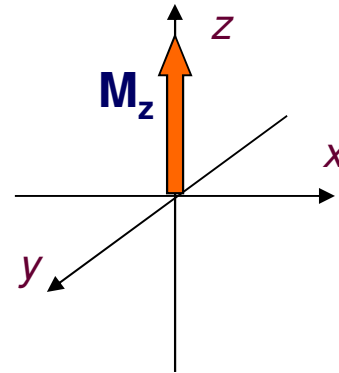


Není rovnovážný stav

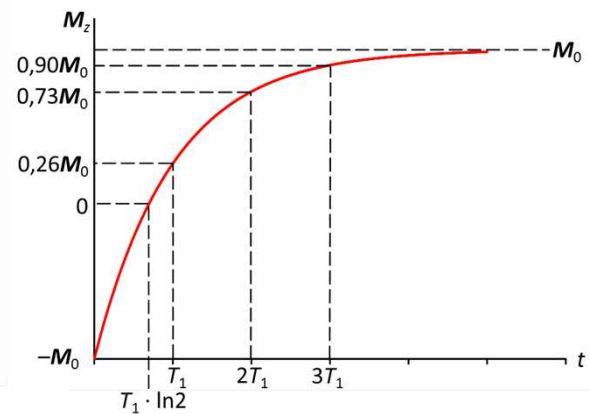
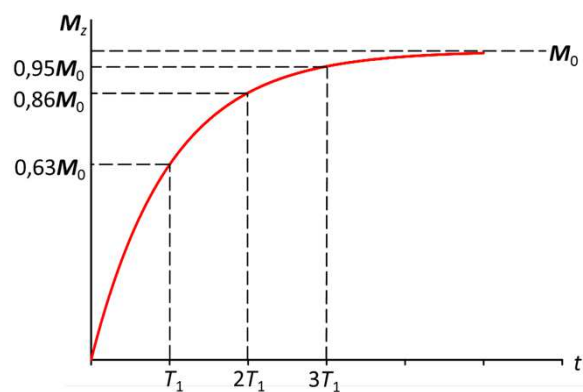
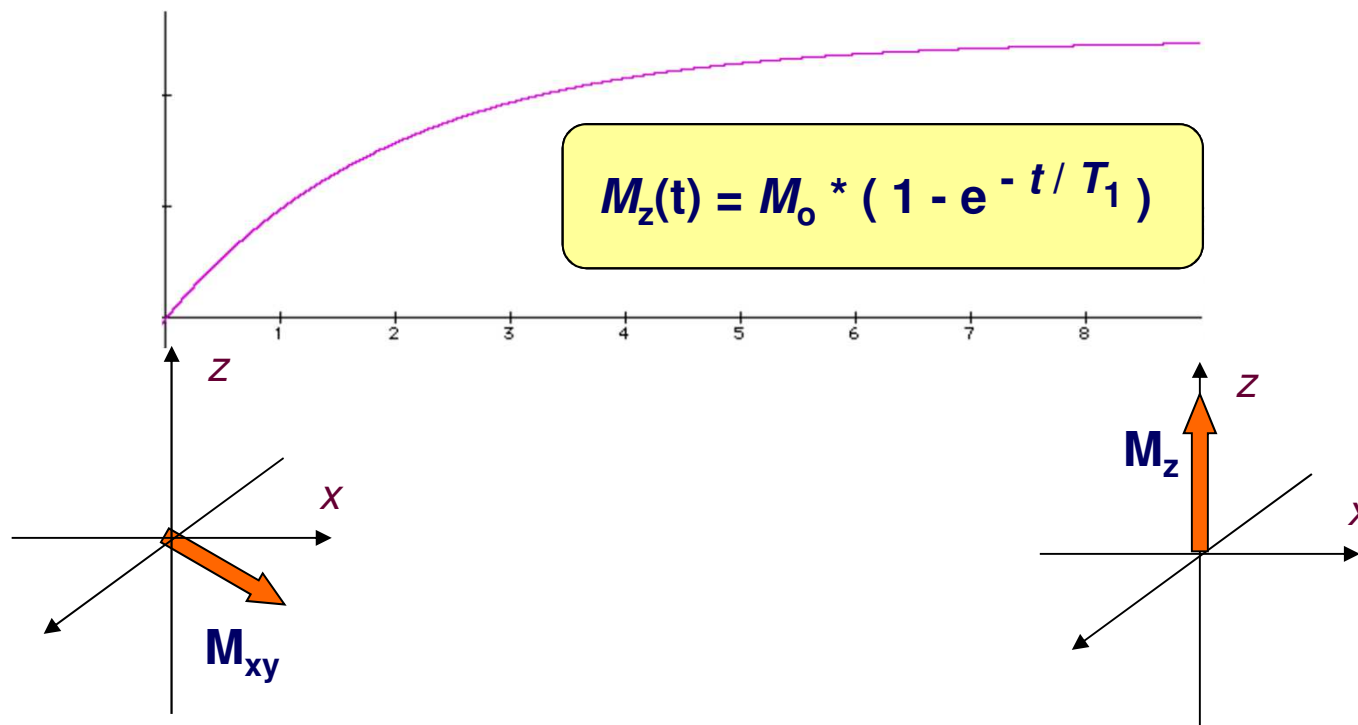


Relaxace – podélná (ve směru osy z, spin-mřížková)

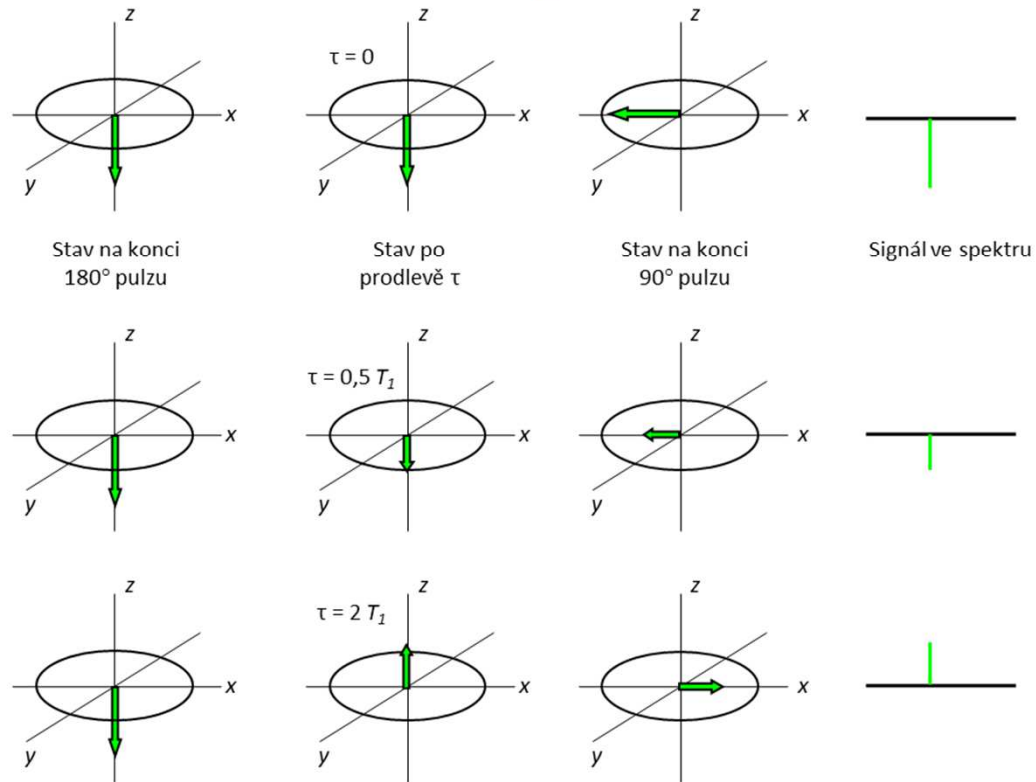
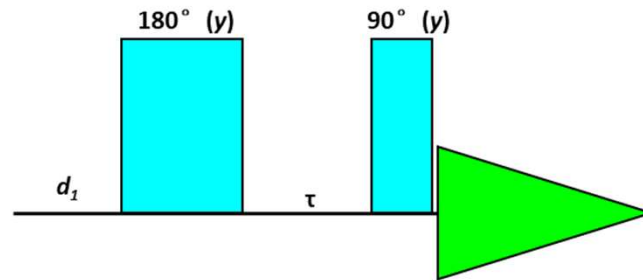
- příčná (ubývání magnetizace v rovině xy, spin-spinová)



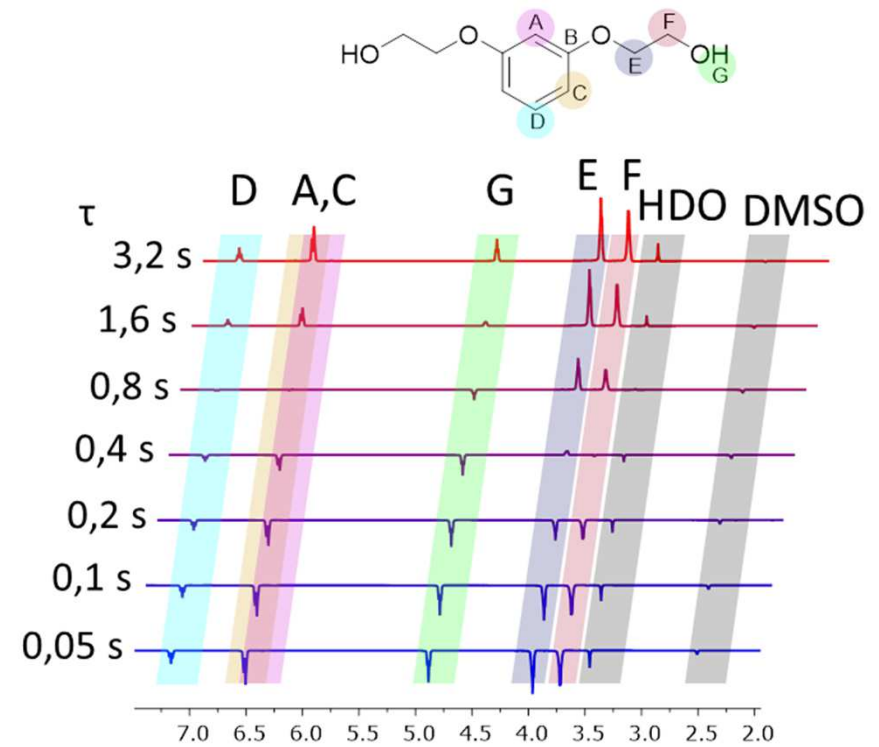
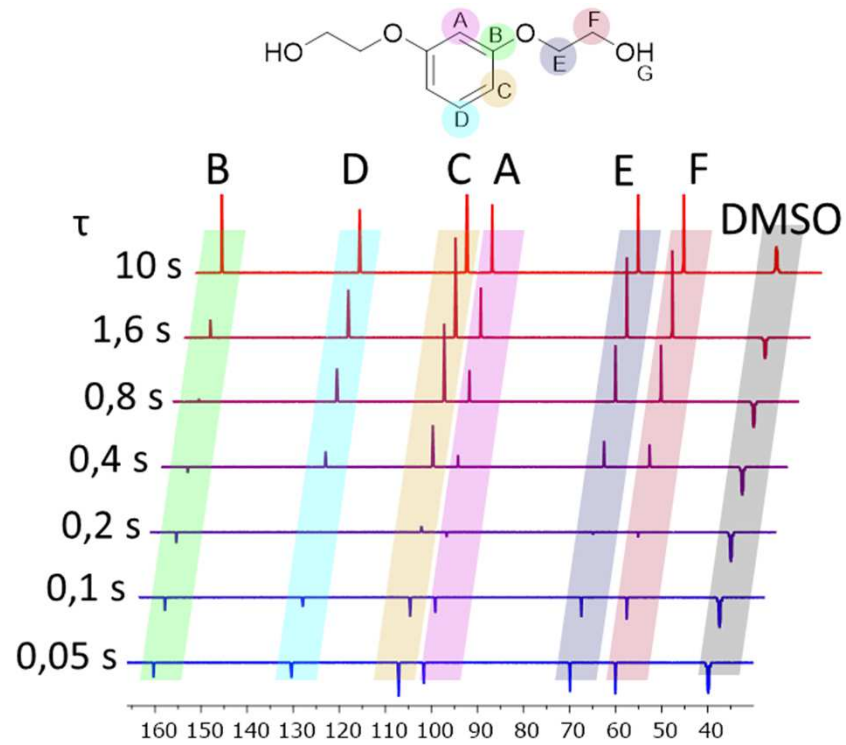
Podélná relaxace (T_1)



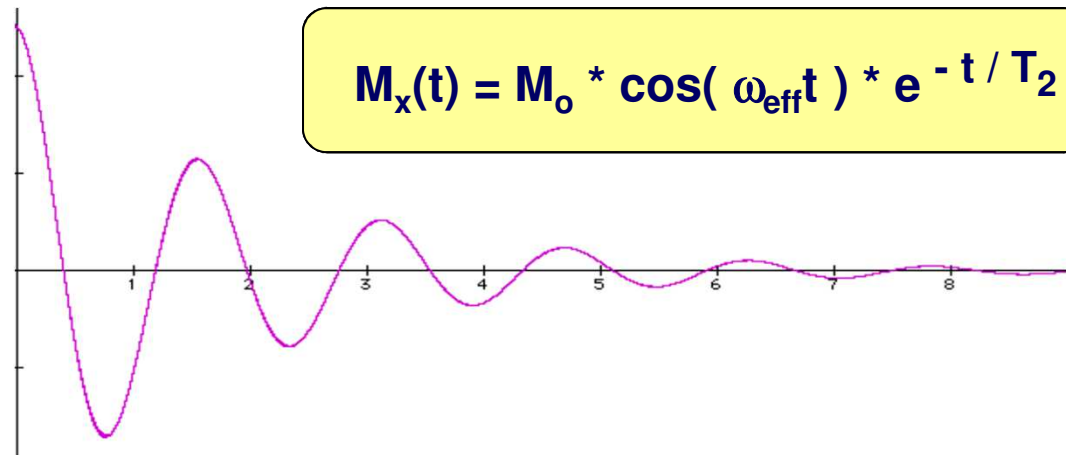
Inversion recovery (IR)



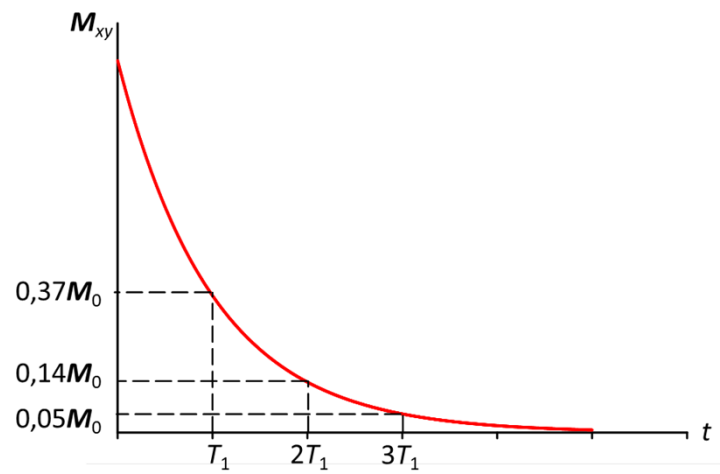
Inversion recovery (IR)



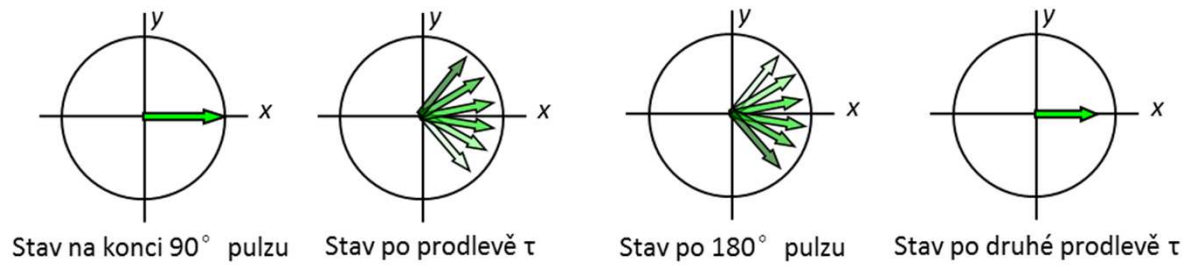
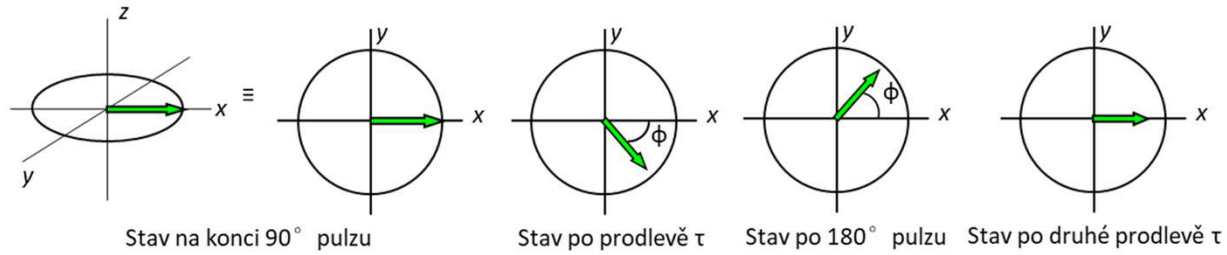
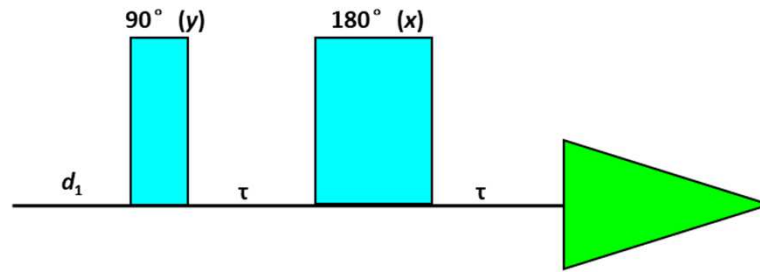
Příčná relaxace (T_2)



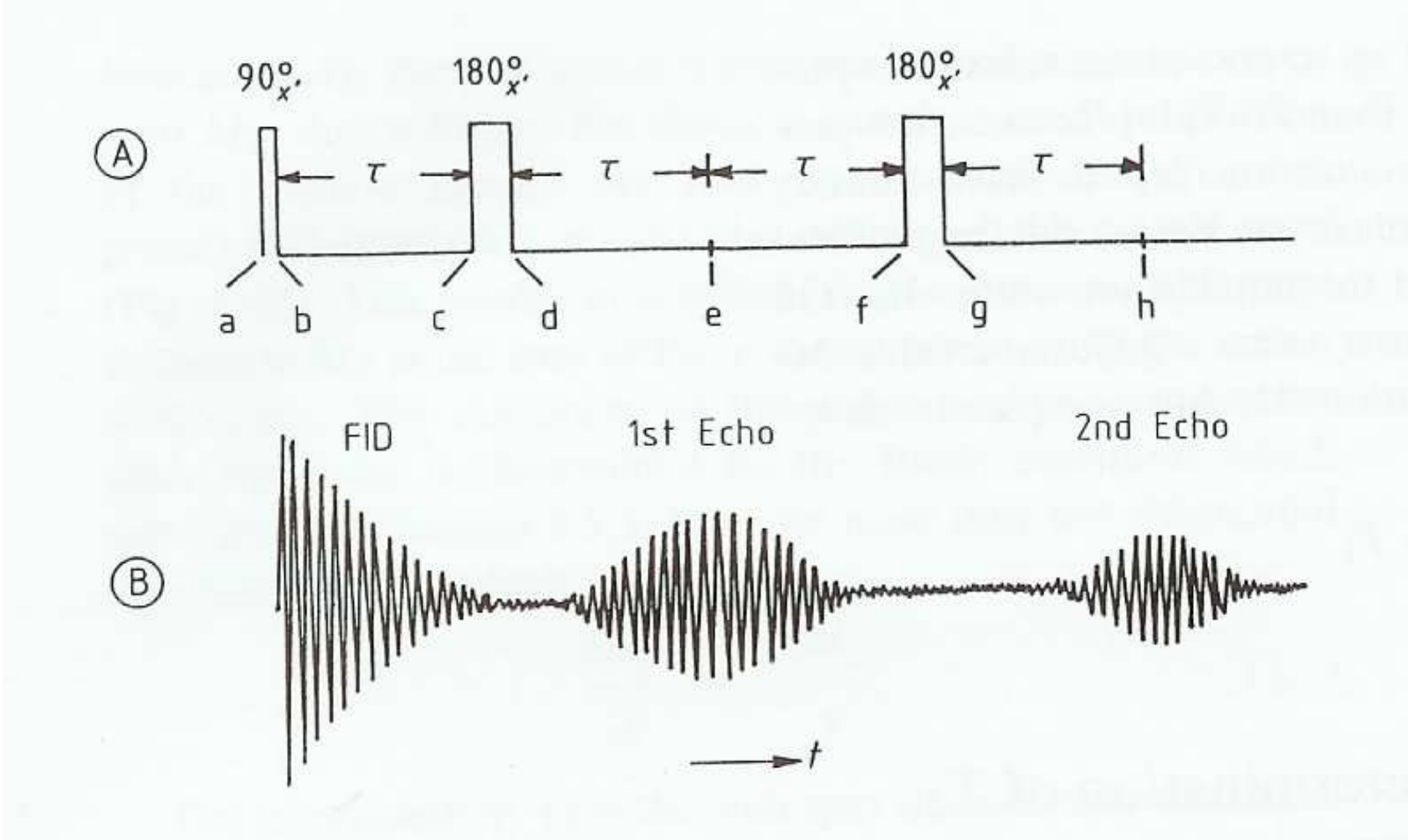
$$M_x(t) = M_0 \cdot \cos(\omega_{\text{eff}} t) \cdot e^{-t/T_2}$$



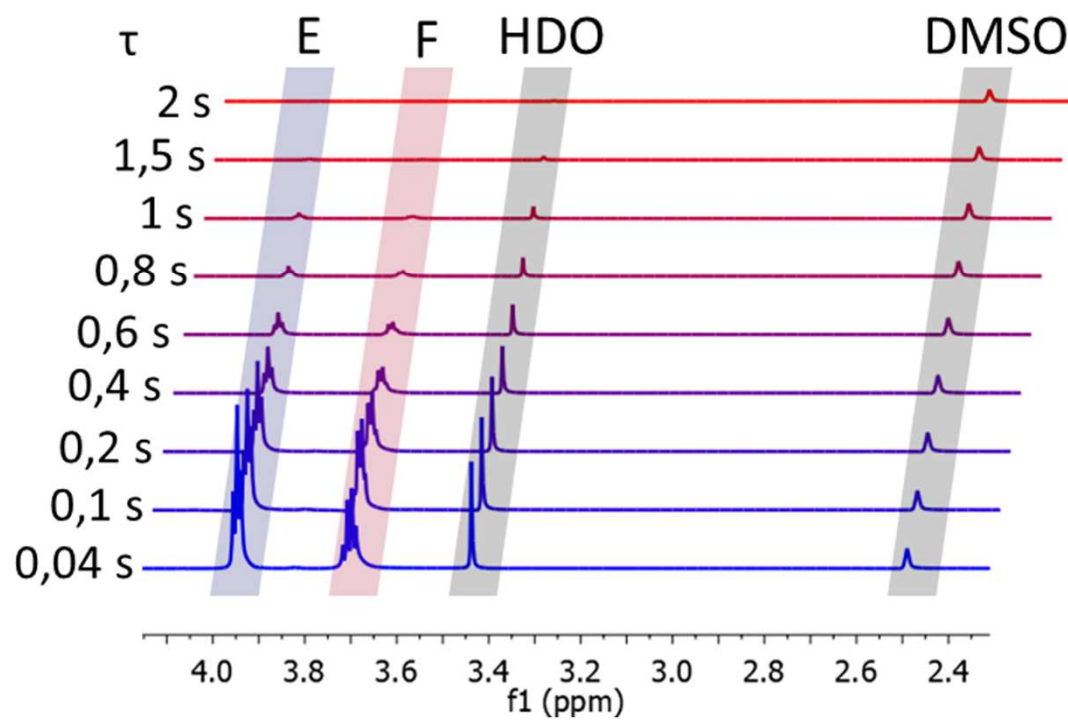
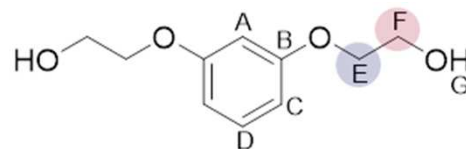
Spinové echo



Spinové echo



Spinové echo



$$T_1 \geq T_2$$

Kvarterní uhlíky – dlouhé T_1

Velké molekuly - krátké T_2

Potlačení signálu vody

Čím kratší T_2 , tím větší pološířka signálu

