

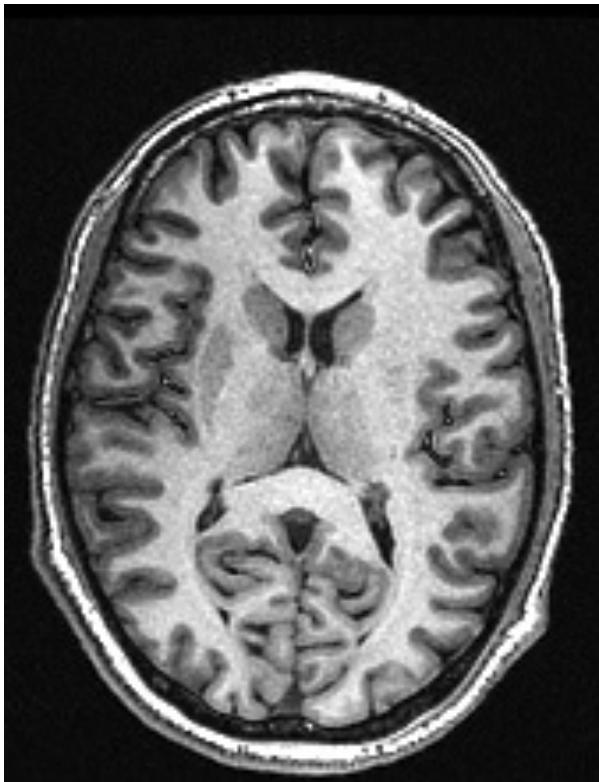


MRI pulse sequences for neuroimaging research

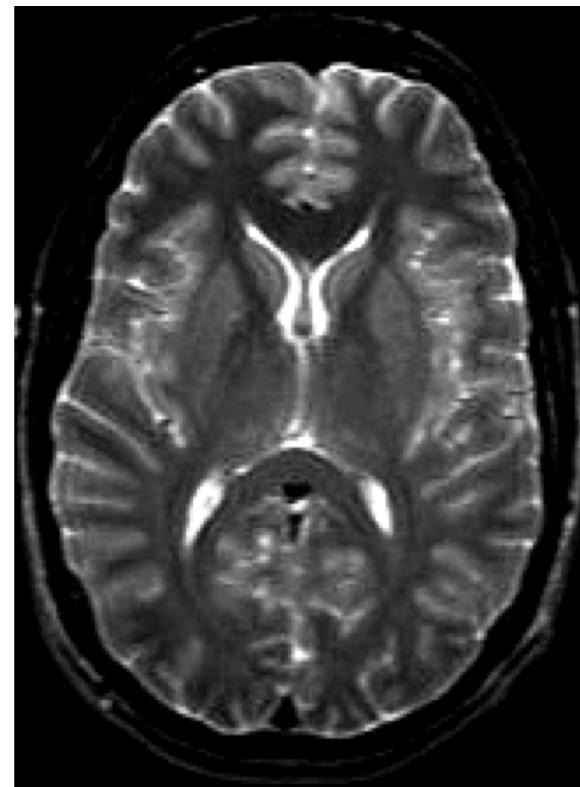
spin-echo



MRI Contrast



T1-weighted

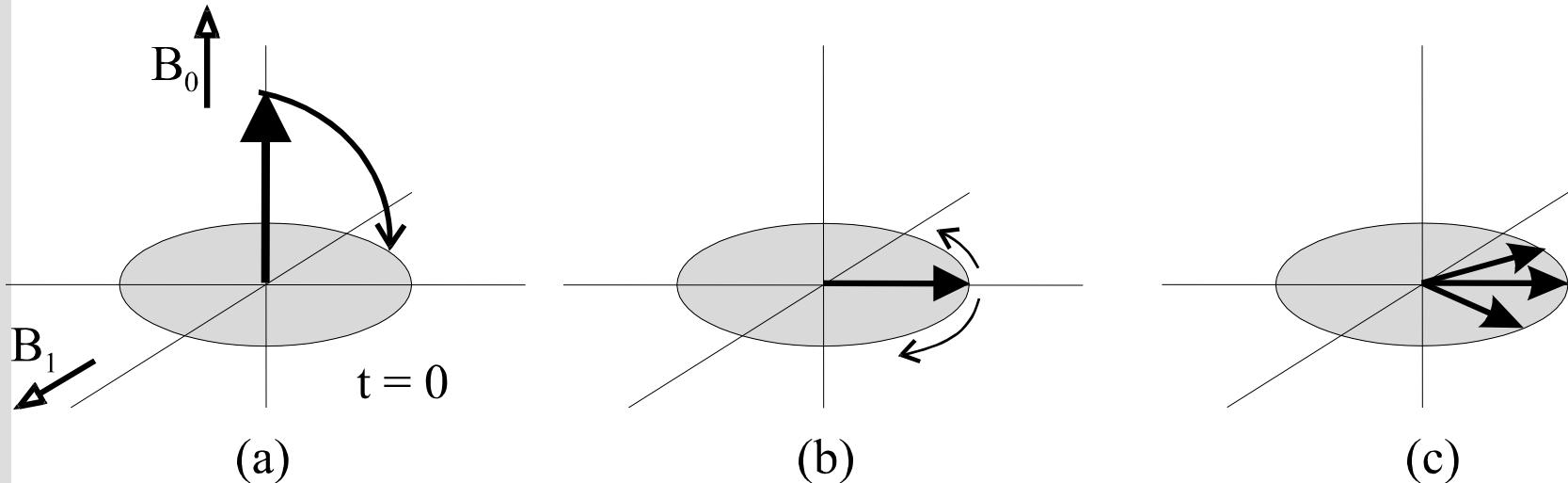


T2-weighted



Relaxation – T2

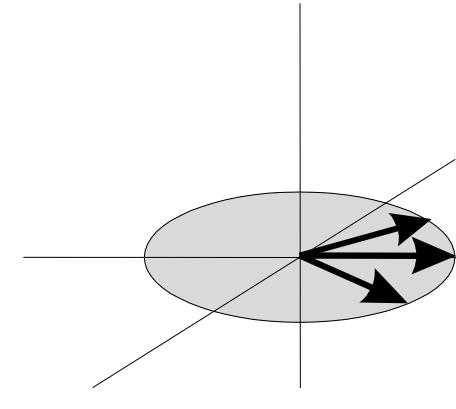
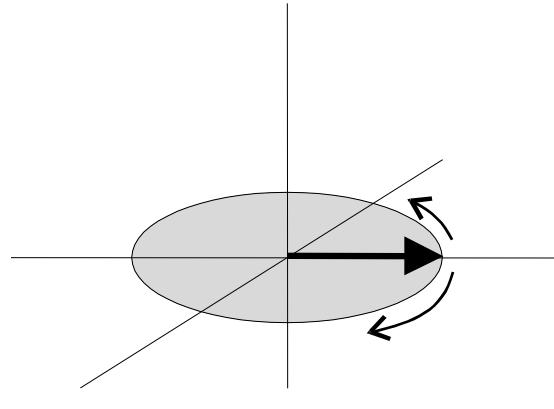
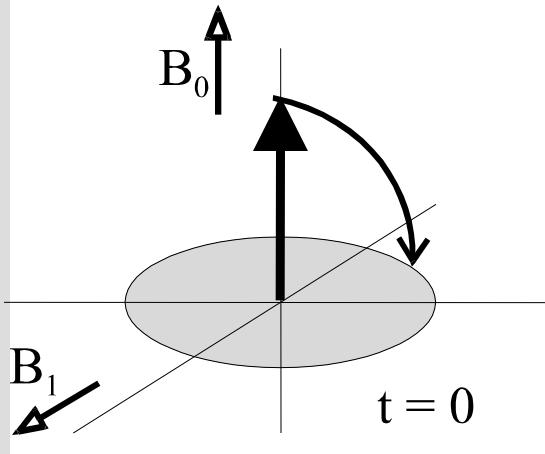
Spins get out of phase with one another (“dephase”)





Relaxation – T2*

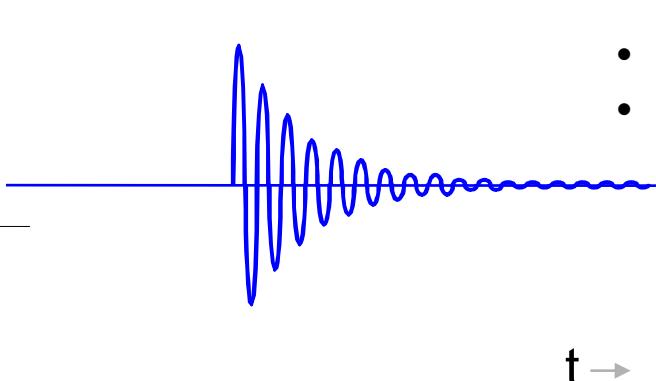
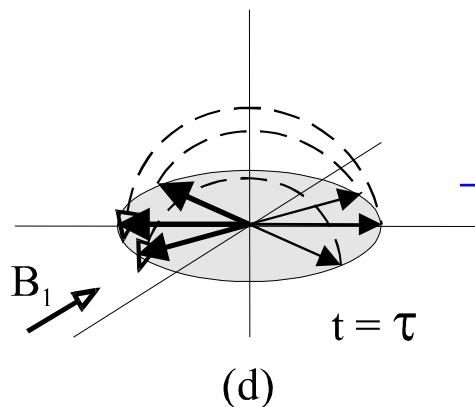
Spins get out of phase with one another (“dephase”)



(a)

(b)

(c)

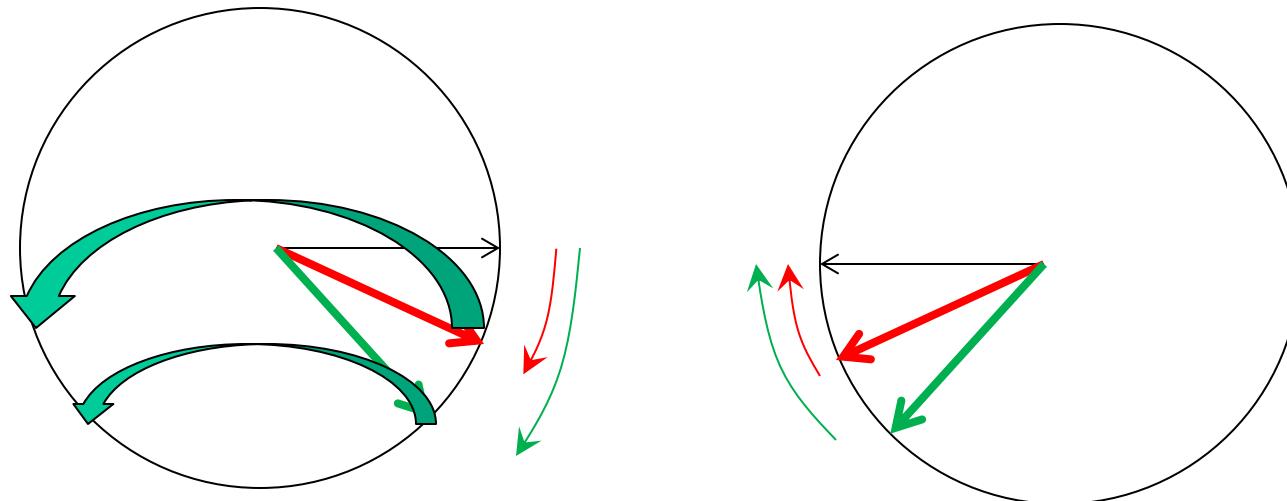


- Spin-spin interactions (T2)
- B0-field non-uniformity (T2')

$$\frac{1}{T2^*} = \frac{1}{T2} + \frac{1}{T2'}$$

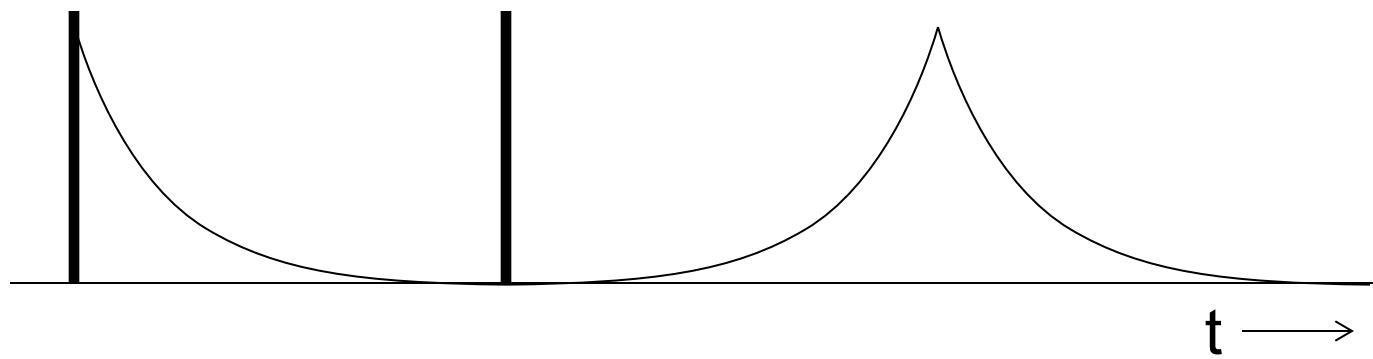


Spin Echo



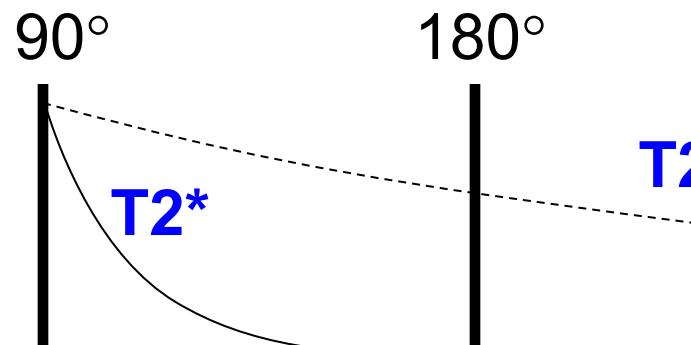
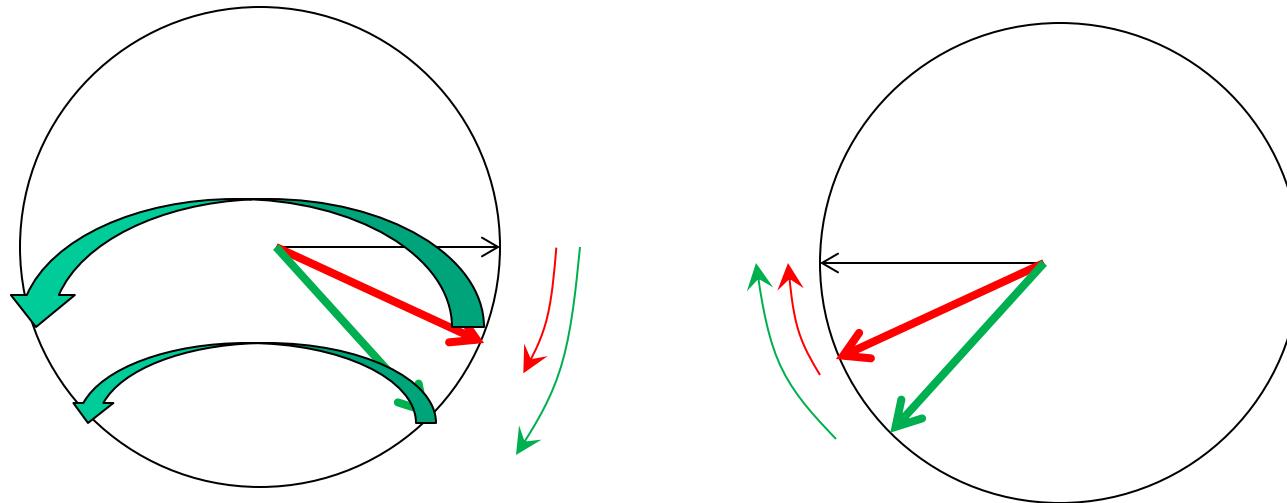
90°

180°





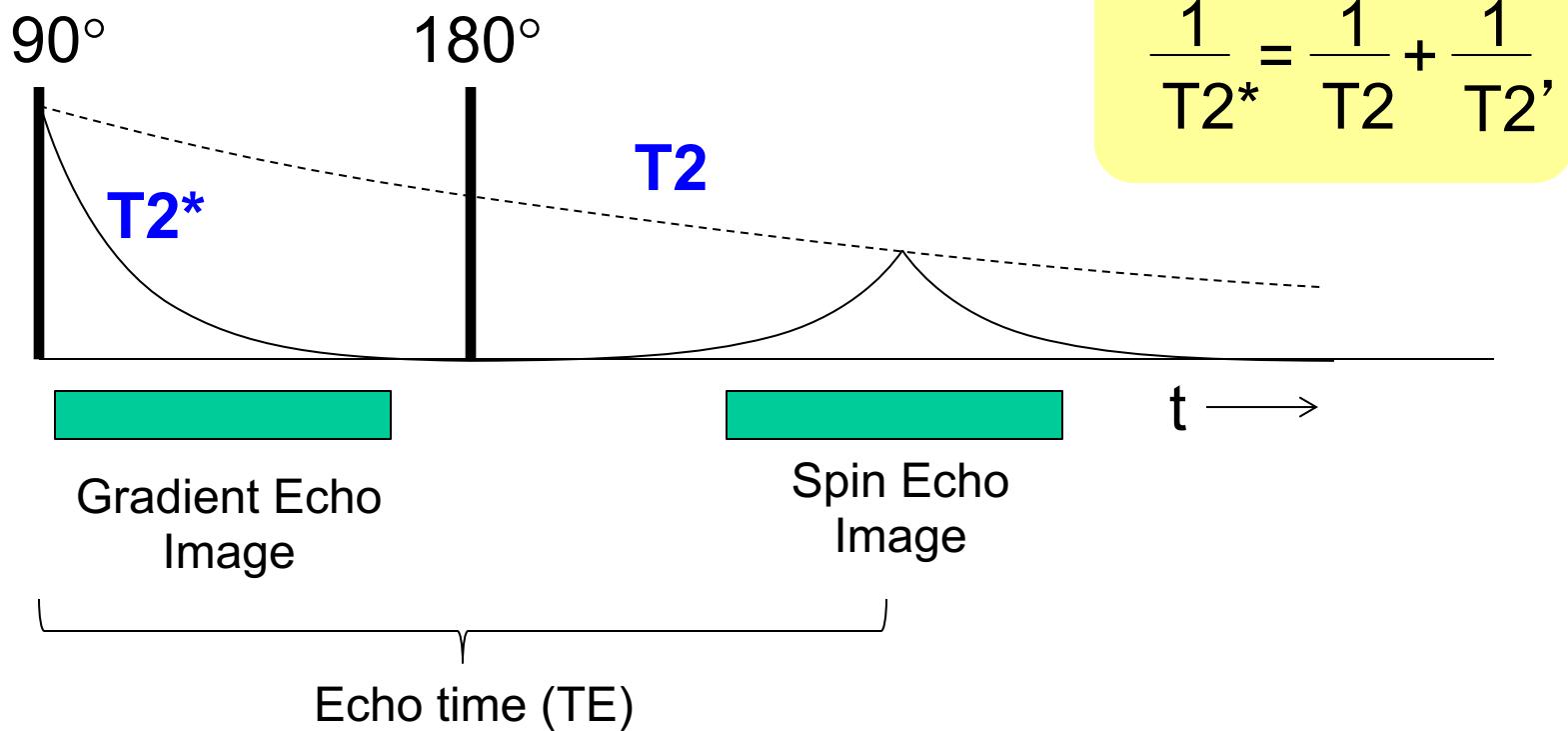
180 degree pulse



$$\frac{1}{T2^*} = \frac{1}{T2} + \frac{1}{T2'}$$

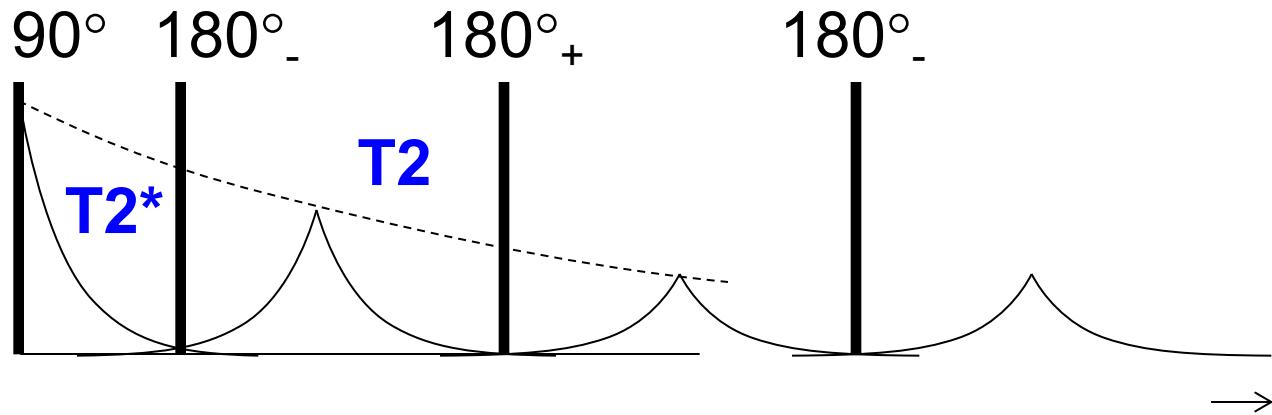


Gradient and Spin Echoes





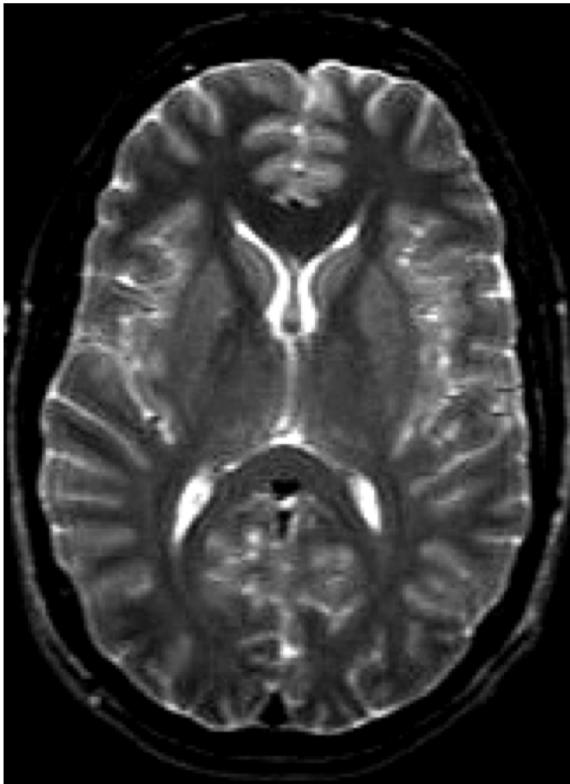
Multiple 180



CPMG = Carr, Purcell, Meiboom, Gill



Spin-echo (T2-weighted) image



T2-weighted