

MRI Physics Basics

Nuclear magnetic resonance

Hydrogen protons align in magnetic field

Gradient fields

Spatial encoding of signal

K-space

Frequency domain data representation

Relaxation times (T1, T2)

Tissue-specific signal recovery

Signal equation

$S \propto \rho \cdot (1 - e^{(-TR/T1)}) \cdot e^{(-TE/T2)}$

No Magnetic Field



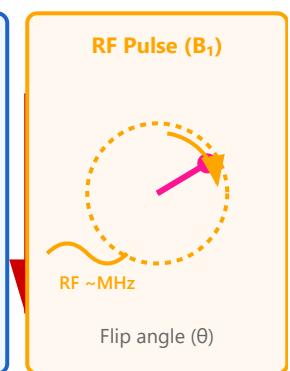
Random orientation

B₀ Field Applied

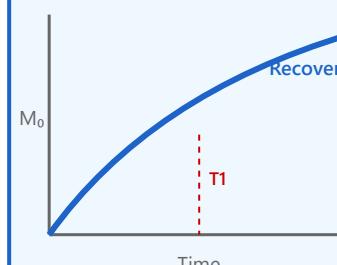


Net magnetization M₀

RF Pulse (B₁)



T1 Relaxation



T2 Relaxation

