

Radio Frequency Pulse, Resonance and Transversal Magnetization



Ask Mish

- So, the precession rate is proportional to the strength of MF.
- At 1T the rate is 42.58MHz,
- at 2T is 2x 42.58MHz,
- at 3T is 3x42.58MHz.
- Let's assume we applied a MF of 1T. If we apply now **radio frequency energy** aka **RF PULSE** at the precessing rate of 42.58 MHz then the protons are able to absorb this energy. 3 things will happen next:
 - First, the absorbed E will flip some p+ from low state E into high state E. When we'll have 50% p+ on both sides (low and high state E) then the longitudinal magnetization vector=0
 - Second, the absorbed E will make p+ **synchronize in phase and spin together**, process called **RESONANCE** (word included in RMN)
 - Third, the p+ will precess along the axis of radio frequency waves. If we **add up all the magnetic moments** of the p+ we'll obtain a vector oriented 90 degrees to the previous (longitudinal) vector called **TRANSVERSAL MAGNETIZATION**. This vector generates a **current (SIGNAL)** that can be detected by a coil or antenna. This is the result that we are looking in NMR.

