

# NMR Fundamentals

## Nuclear Spin in Magnetic Field

$^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^{31}\text{P}$  nuclei have spin  $\frac{1}{2}$

### Chemical Shift ( $\delta$ )

Electronic environment. ppm scale. TMS reference.

### J-coupling

Spin-spin splitting. Connectivity information.

### 2D NMR

COSY, NOESY, HSQC for structure determination

### Biomolecular NMR

Protein structure in solution. Dynamics information.