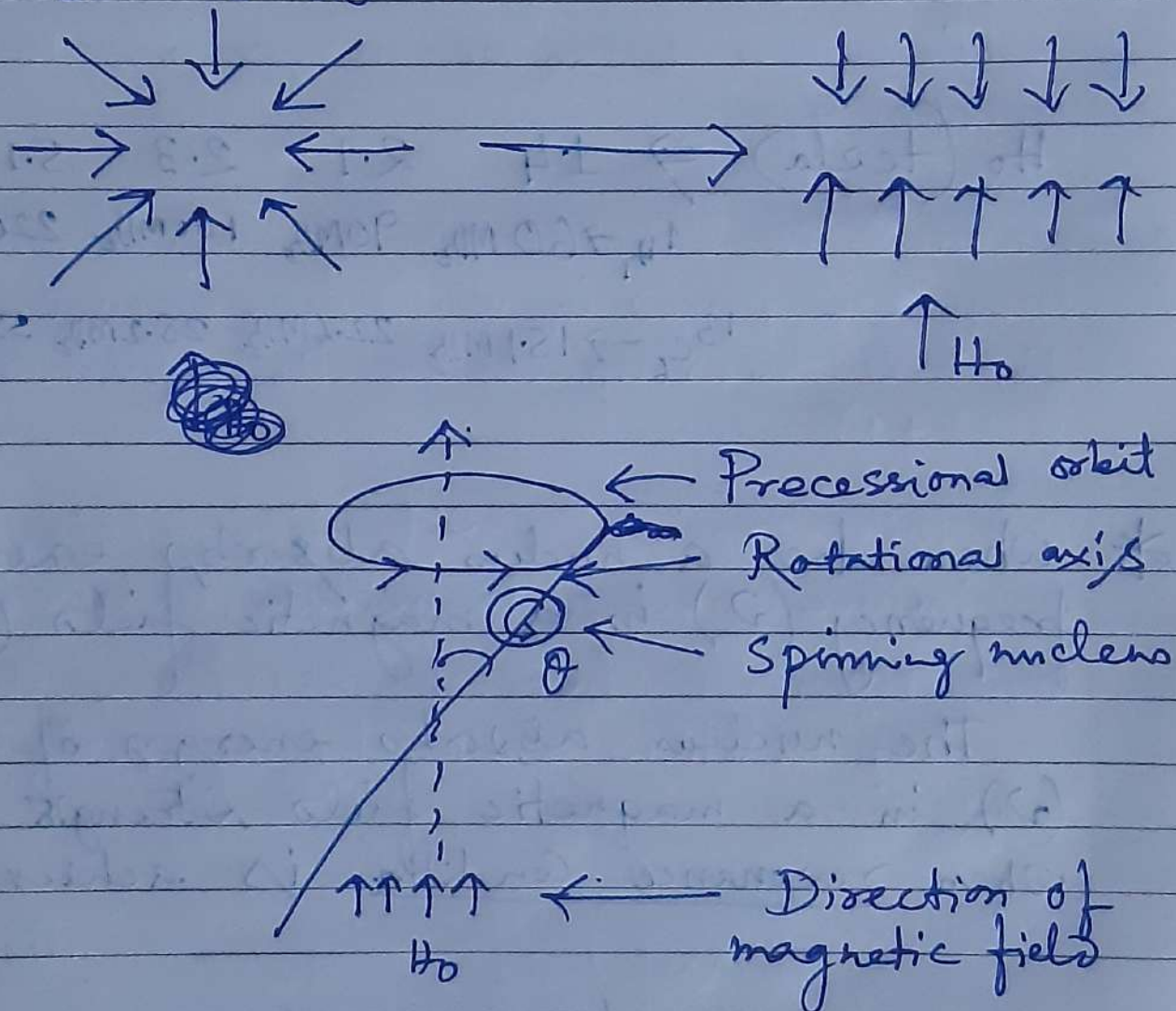


* What is meant by Resonance Condition?

Unless the axis of the nuclear magnet is oriented exactly parallel or antiparallel with the applied magnetic field, there will be a certain force by the external field to so orient it. But because the nucleus is spinning, the effect is that its rotational axis draws out a circle perpendicular to the applied field (H_0) as shown in the following figure.



Motion of a nucleus in a magnetic field:

The motion of the nucleus is called Precession.

* What is the necessary condition that ensure net absorption of energy by nuclear magnet?

The necessary condition that ensure net absorption of energy by the nuclear magnet is the small finite excess of the nuclei in the lower energy state.

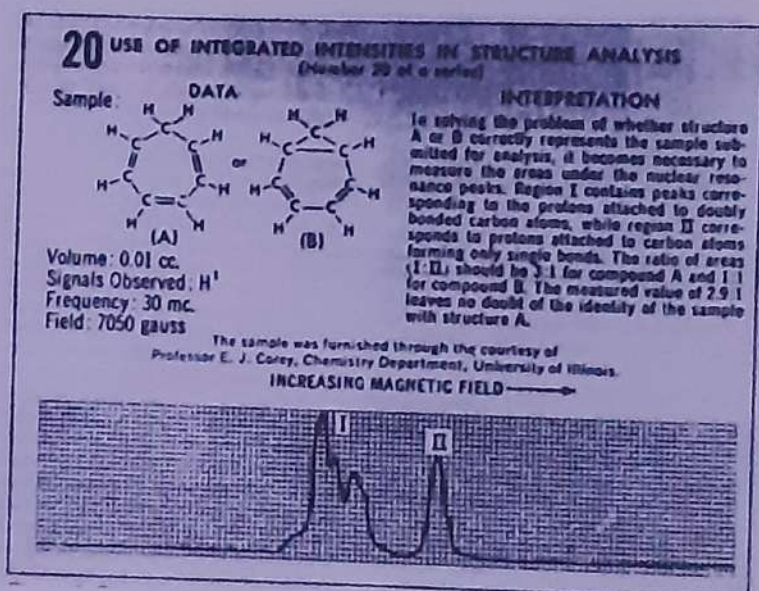
Related question / Further Study :-

- ① What is "Saturation Condition"?
- ② Why higher energy / higher magnetic field is necessary in NMR Spectroscopy?
- ③ Why ^{13}C is NMR active nuclei?
- ④ How abundance and gyromagnetic ratio is important for NMR active nuclei?

NMR Spectrometer in the 1960's



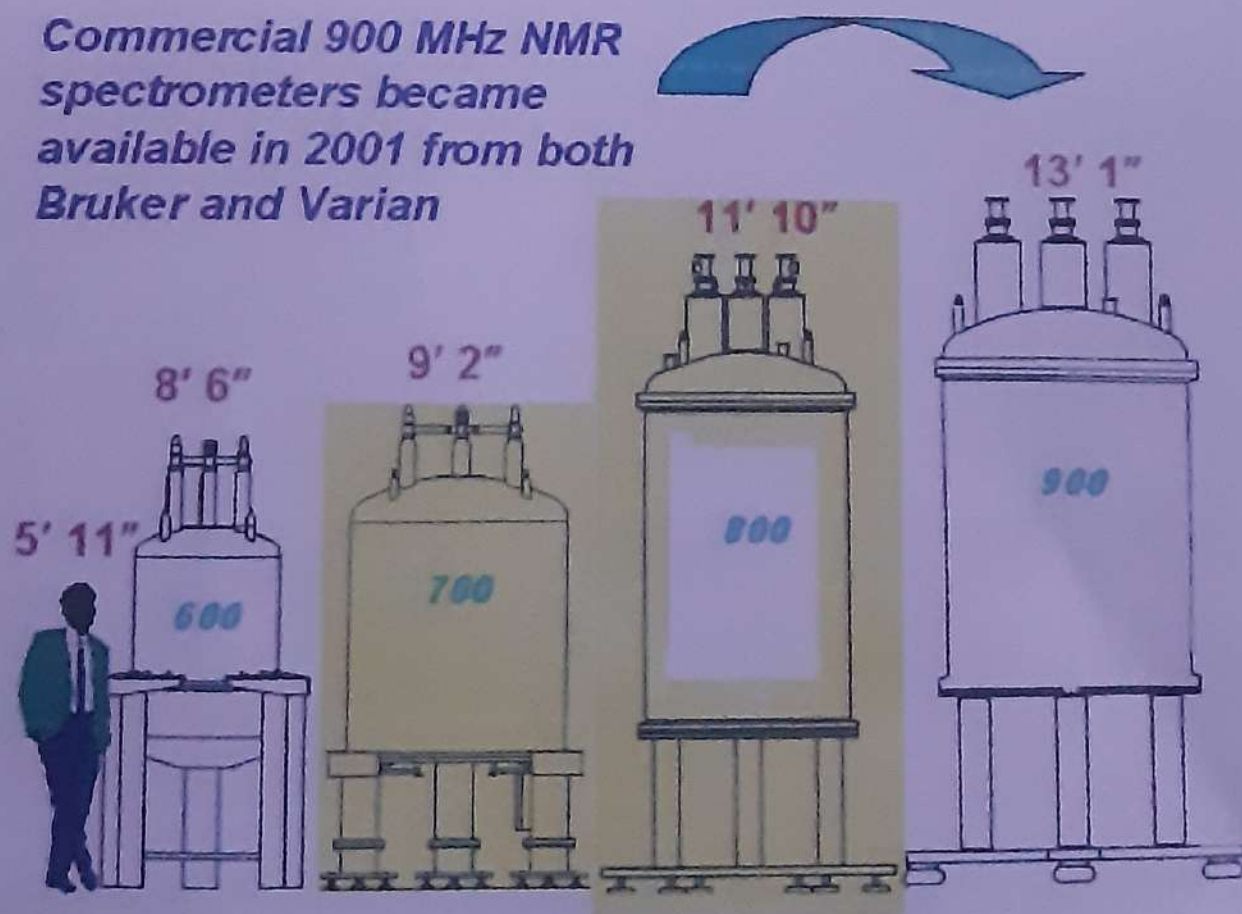
Varian A-60 spectrometer
(1961)
"60 MHz instrument"



The first problem solved by NMR spectroscopy
E. J. Corey

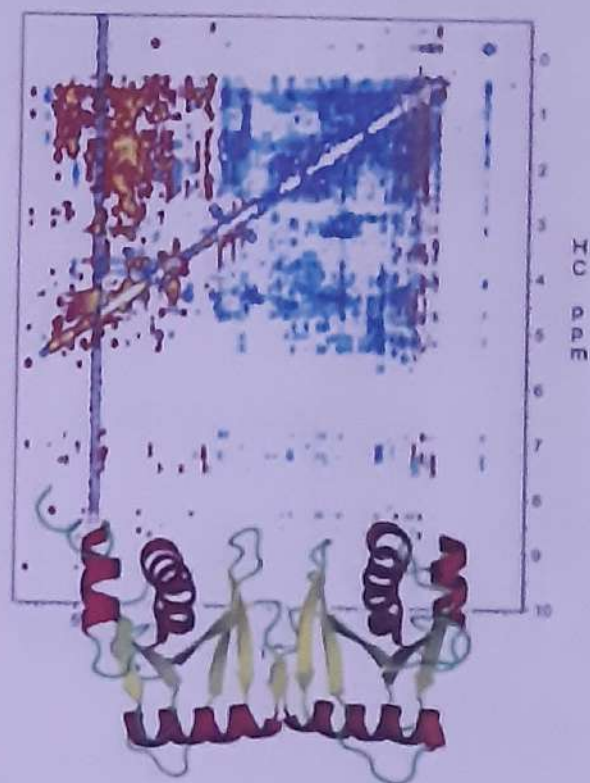
High Field NMR Spectrometers

Commercial 900 MHz NMR spectrometers became available in 2001 from both Bruker and Varian





Varian 900 MHz 21.1T magnet NMR



2D projection of a 3D NOESY-¹³C-HSQC spectrum of protein