

From: Brown, Kalinowski, Berger; 150 and more NMR experiments

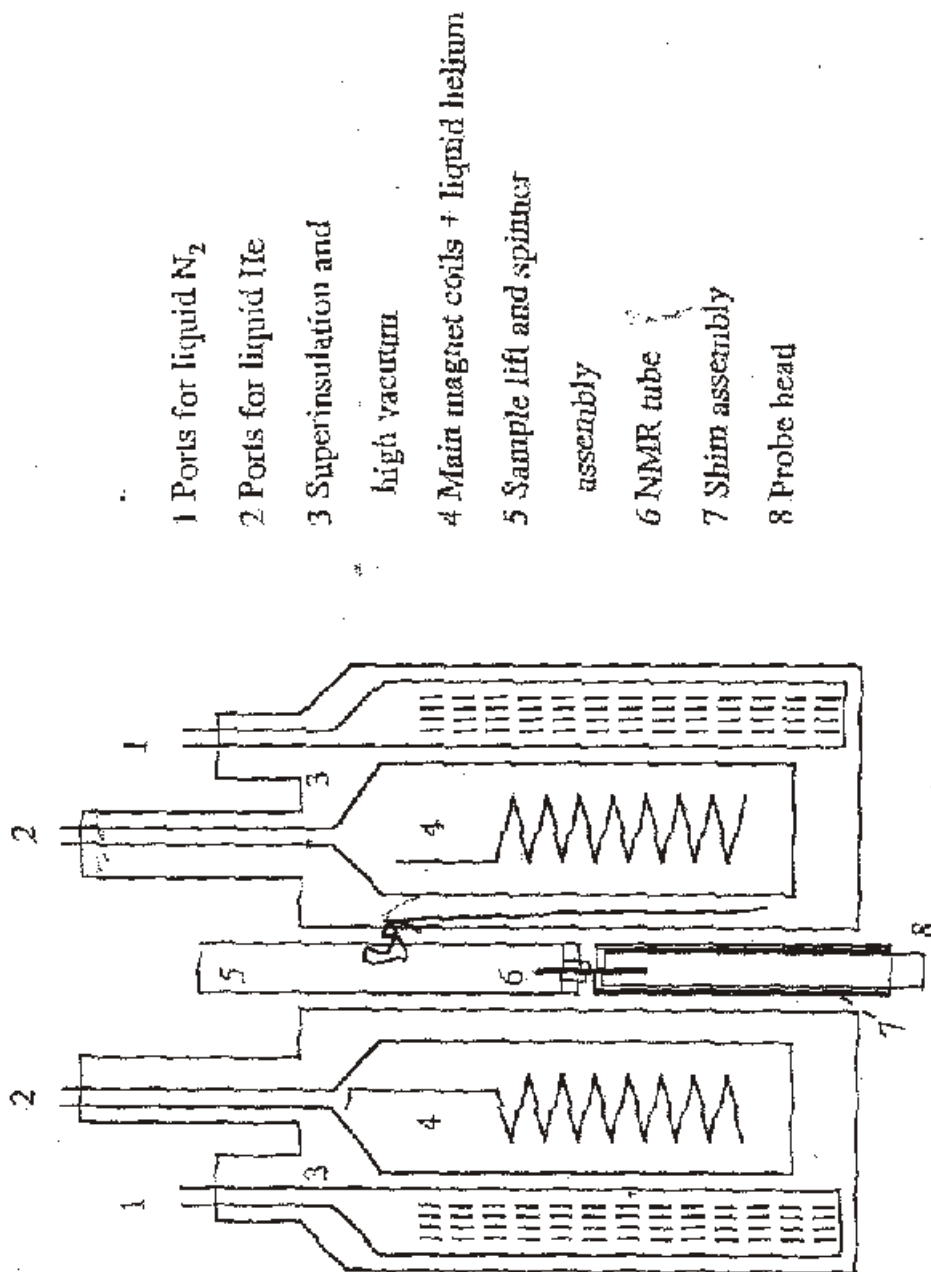


Fig. 1.1 Principles of a superconducting magnet

1.1.2 The Spectrometer Console

The spectrometer console provides at least three radiofrequency channels. Usually these frequencies are derived from digital frequency synthesizers which are phase-locked to a central quartz oscillator. These frequencies are controlled, amplified, pulsed, and transmitted to the probe-head. The various signals are preamplified, then mixed with the local oscillator frequency to yield the intermediate frequency (i.f.) The i.f. signal is further amplified, then in a second mixing stage the NMR audio signal is obtained after quadrature phase detection. The two signal components are digitized in the ADC and fed into the computer memory or, in the case of the lock signal, used for field/frequency regulation. Figures 1.2 and 1.3 show the principles of the system.

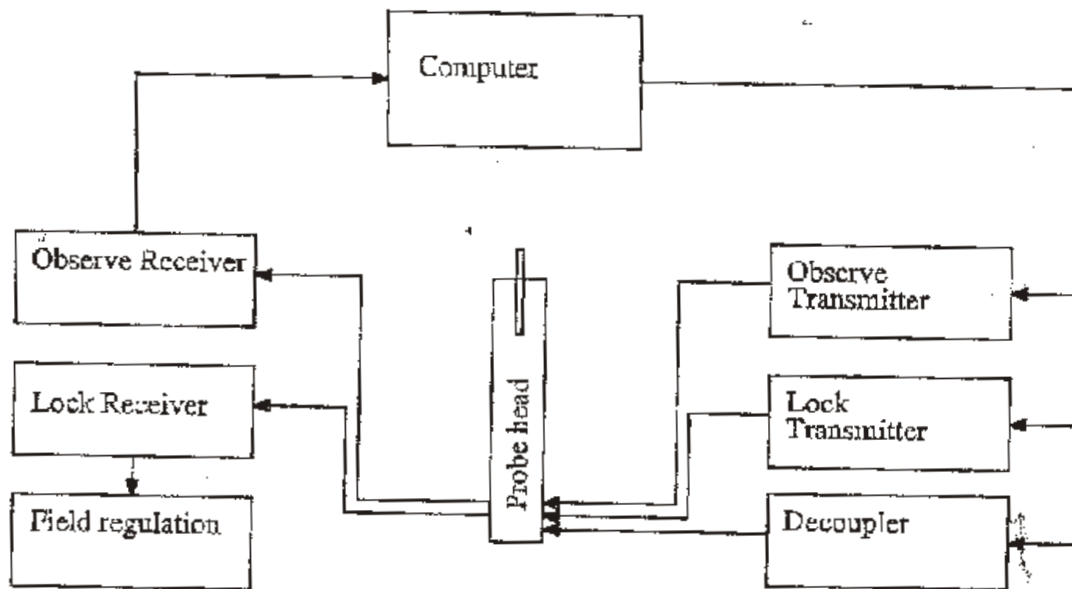


Fig. 1.2 Principles of an NMR spectrometer

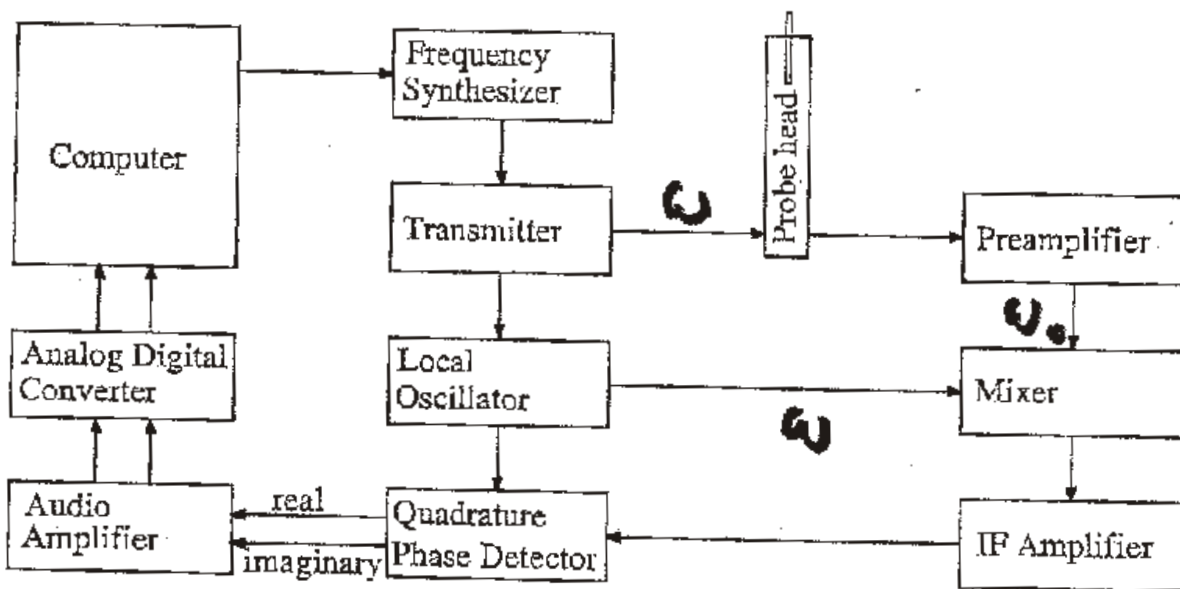


Fig. 1.3 Components of the observe channel

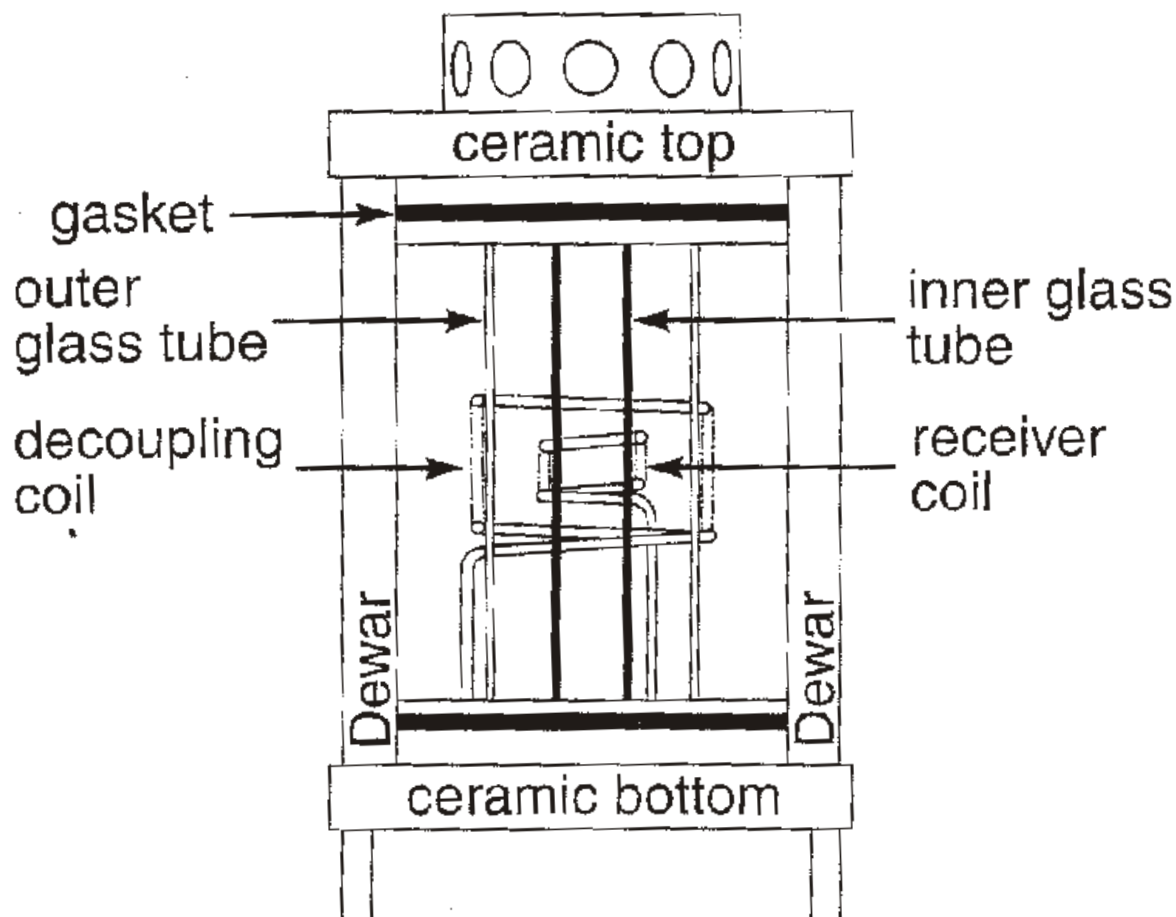


Figure 5.4 A cross-section through a typical NMR probehead. Note all the glass in the probehead which makes it fragile. The coils are wound as saddles on the glass tubes (Helmholtz double coils) to give the RF field normal to B_0 . (Reproduced with permission of Bruker Spectrospin.)

the probehead means that it is fragile and failure to insert the NMR tube on a cushion of air can result in breakage.