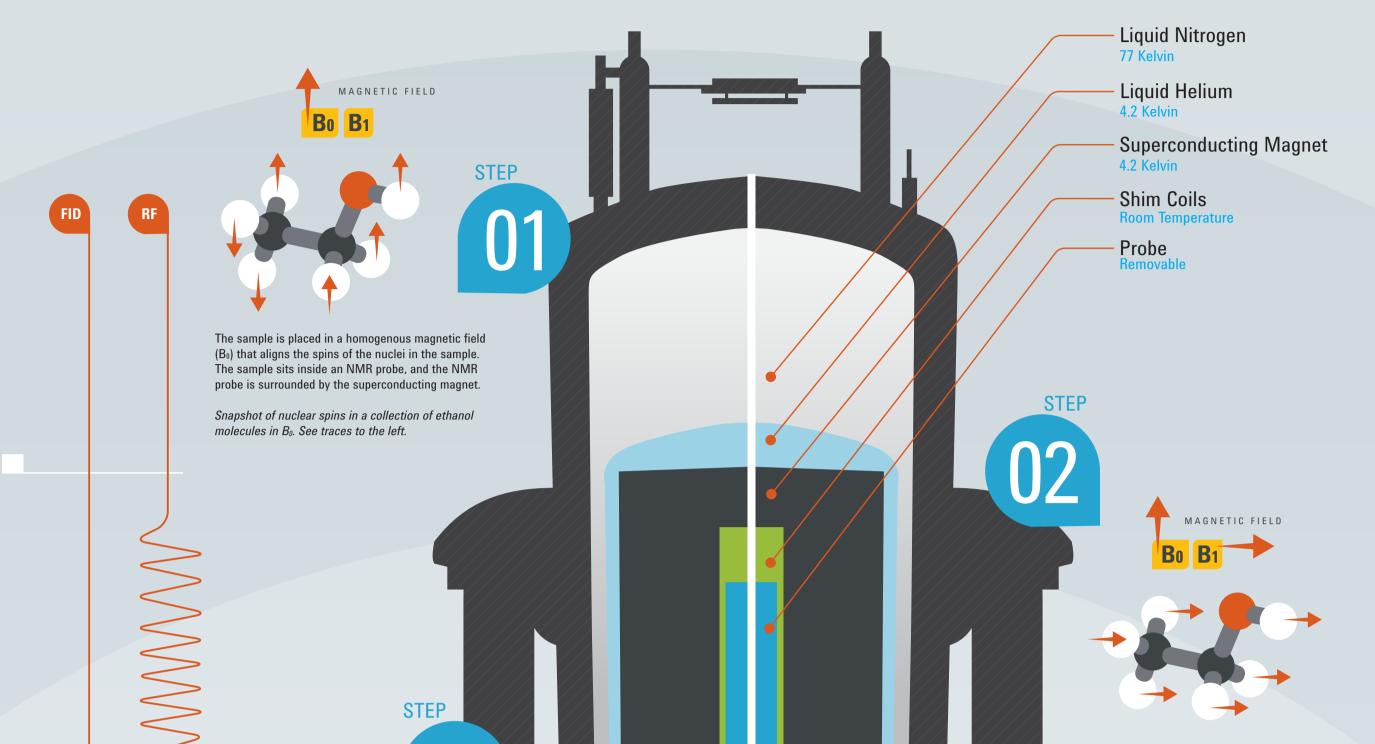
FOW NNR WORKS

Nuclear magnetic resonance (NMR) is a technique used by scientists in a broad range of disciplines including synthetic chemistry, drug discovery and development, life science research, process monitoring, food quality and safety, energy discovery and production, biochemistry, and materials science—to understand molecular structure and molecular dynamics, quantify molecular species, and monitor chemical processes.



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MAGNETIC FIELD

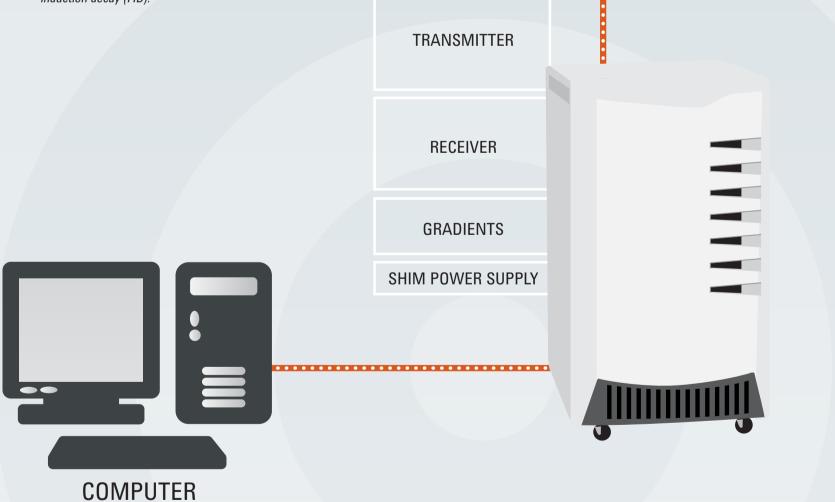
B

U3

Through a computer interface on the host computer (using VnmrJ software), the user controls the pattern of RF pulses sent to the sample. Each RF pulse has a specific frequency, width, and shape, which modulates the B₁ field. Different pulse patterns extract different kinds of information from the sample.

The console provides the sophisticated electronics that generate the desired RF pulses and processes the signal emitted by the nuclei.

Snapshot of nuclear spins in a collection of ethanol molecules an intermediate time after B₁ is off. See traces to the left showing free induction decay (FID).



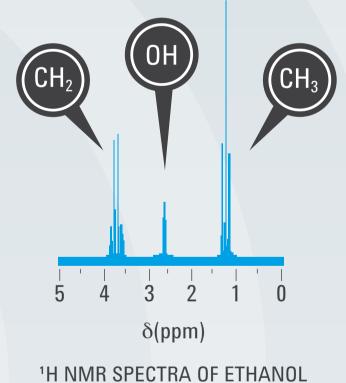
The probe contains the radio frequency (RF) coils that transmit strong RF pulses into the sample. These RF pulses generate an additional magnetic field (B_1). The operator controls the B_1 field through the RF pulses, thus directing the rotation of the spinning nuclei. The RF coils also detect the much weaker signals produced by the spinning nuclei in the sample.

Snapshot of nuclear spins in a collection of ethanol molecules after a 90° RF pulse, which created a temporary B_1 magnetic field. See traces to the left.

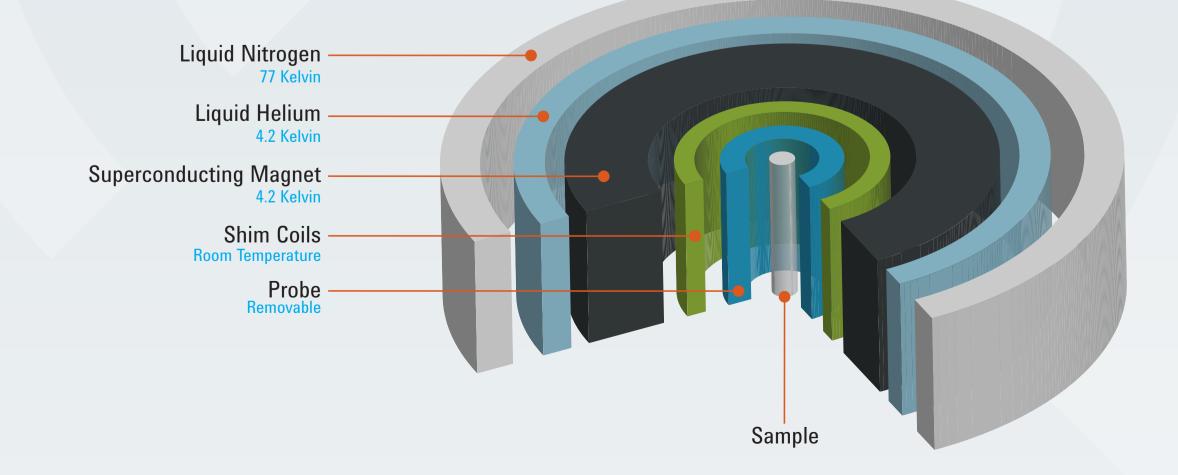
STEP

RF signals detected by the probe are sent to the console and then to the host computer, where the user processes them into NMR spectra. The location, shape, and area of the signals in each spectrum provide spatial and connectivity information about the nuclei in the sample.

Fourier Transform to convert the FID signal to a spectrogram.



⁽CH₃CH₂OH)



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