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, petroleum discovery and production, biochemistry, and materials science—to understand molecular structure and molecular dynamics, quantify molecular species, and monitor chemical processes. Learn more at www.agilent.com/chem/nmr.

Nuclear spins in a collection of ethanol molecules in an intermediate state after a 90° RF pulse. The RF pulse is applied to the sample via the RF coils in the NMR probe, and the magnetic component of the RF pulse, called $B_1$, generates an additional, temporary magnetic field that is orthogonal to the primary field $B_0$. The nuclear spins are twisted out of alignment with $B_0$, and each RF pulse has a specific frequency, width, and shape, which modulates the $B_1$ field to elicit different kinds of information from the sample.

Fourier Transform is performed on the FID signal to create an NMR spectrum. The location, shape, and area of the signals in each spectrum provide spatial and connectivity information about the nuclei in the sample.