Nuclear Magnetic Resonance

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(Dated: February 28, 2014)

Nuclear magnetic resonance exists!

Early work in nuclear magnetic resonance (NMR) was done by Isidor Rabi, Felix Bloch, and Edward Purcell.

The apparatus consists of a permament magnet that produces a static magnetic field and a probe circuit that delivers a radio frequency (RF) pulse and detects the resulting signal.

The RF pulses are generated by a 15 MHz frequency synthesizer and fed through a power splitter which sends half of the signal to a double-balanced mixer and the other half to a phase detector for the output. The double-balanced mixer serves as a gate for the RF signal and is controlled by a micro-controller based digital pulse programmer which sets the pulse widths and timings. The RF signal is then amplifed and sent to the probe circuit.

The sample under study is enclosed in a ten-turn copper coil which serves as an inductor in a tuned LC circuit.

The static magnetic field was measured with a Hall magnetometer as 1760 ± 30 G, including systematic uncertainties from the Hall magnetometer calibration and measurement.