lambda scientific

Construct, Conduct & Comprehend Physics Experiments

LEAI-13 Experimental System of Pulsed NMR

- 10 easy-to-use sample tubes
- High homogeneous magnetic field
- Stable & reliable experiment data
- Friendly software & convenient operation

Pulsed NMR applies a pulsed RF field to the nuclei system and observes the response of the nuclei system. The FFT technology is used to transform the time domain signal into a frequency domain signal, which is equivalent to multiple single-frequency CW-NMR spectrometers at the same time. Therefore, the nuclear magnetic resonance phenomenon can be observed in a larger range, and the signal amplitude is twice as large as the CW ones.

LEAI-13 PNMR Apparatus uses DDS digital synthesis technology for the transmitting pulse source and PID control technology for the temperature control of the electromagnet. The experimental data is stable and reliable, the operation is convenient, and the experiment contents are rich, which can be used in advanced physics labs in colleges and universities.

Using this instrument, the following experimental objectives can be achieved:

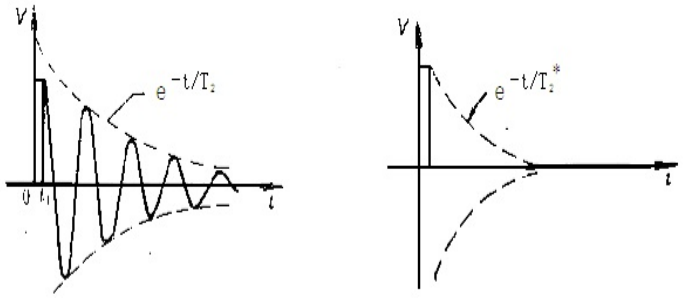
1. Understand the basic physical theory and experimental configuration of a PNMR system. Learn to explain related physical phenomena in PNMR using classical vector model.
2. Learn to use signals of spin echo (SE) and free induction decay (FID) to measure T_2 (spin-spin relaxation time). Analyze the influence of magnetic field homogeneity on NMR signal.
3. Learn to measure T_1 (spin-lattice relaxation time) using reverse recovery.
4. Qualitatively understand the relaxation mechanism, observe the effect of paramagnetic ions on nuclear relaxation time.
5. Measure T_2 of copper sulfate solution at different concentrations. Determine the relationship of T_2 with the change of concentration.
6. Measure the relative chemical displacement of the sample.

Specifications

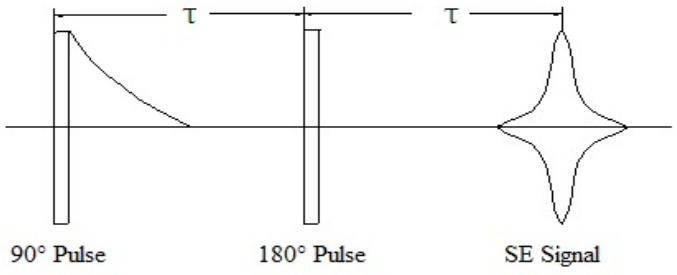
Power supply of modulation field	maximum current 0.5 A, voltage regulation 0 - 6.00 V
Power supply of homogenous field	maximum current 0.5 A, voltage regulation 0 - 6.00 V
Oscillator frequency	20 MHz
Magnetic field strength	0.470 T
Magnetic pole diameter	100 mm
Magnetic pole distance	20 mm
Magnetic field homogeneity	20 ppm (10 mm × 10 mm × 10 mm)
Controlled temperature	36.500 °C
Magnetic field stability	4 hours warm to be stabilized, Larmor frequency drift less than 5 Hz per minute.

Part List

Constant Temperature Unit	1	including electromagnet and temperature control device
RF Transmitting Unit	1	including power supply of modulation field
Signal Receiving Unit	1	including power supply of homogenous field and temperature display
Power Cord	1	
Various Cable	12	
Sample Tubes	10	
Instructional Manual	1	



FID Signal



Spin echo signal

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Note: above product information is subject to change without notice.