

SMARtracerTM

STELAR MAGNETIC RELAXATION TRACER

*The First Bench-Top Fast Field Cycling
NMR relaxometer*



SMARtracerTM is an innovative, cost-effective, bench-top Field Cycling NMR instrument designed to measure Magnetic Relaxations as a function of magnetic field strength

*No other conventional Time Domain NMR instrument
can produce such information*



www.stelar.it



SMARtracer™ is the ideal, cost-effective instrument to exploit in clinical and industrial applications the high quantity of information content in the NMRD profiles acquired by means of the Field Cycling NMR relaxometry techniques. In fact, the most pronounced relaxation phenomena in terms of field dependence of T1 and T2 are expected at relatively low magnetic field, where the low-frequency molecular motions may have a large influence on the NMR relaxation. This is particular apparent with longitudinal relaxation time T1.

This information cannot be obtained with any other TD (Time Domain) LR (Low resolution) NMR instrument.

Highlights

- ✓ Measurement of T1 and T2
- ✓ Measurement of NMRD profiles from few KHz to 10 MHz (1H proton Larmor frequency)
- ✓ Variable temperature measurement (-120°C +140°C with 0.1°C precision)
- ✓ Multinuclear operation

Main features

MAGNET

Special design, air coil system
Sample diameter 10mm
Maximum field : 0.25 T (10MHz on 1H)
Homogeneity : < 150 PPM over 1 cm³

TEMPERATURE CONTROLLER

Standard Gas flow system.
Range: -120 to +140 °C Precision and stability: 0.1°C

NMR CONSOLE

Very high performance digital NMR console with direct acquisition of signals up to 90 Mhz, 128 bits/20ns/7 loop levels pulser, 300W linear RF pulse transmitter

SOFTWARE

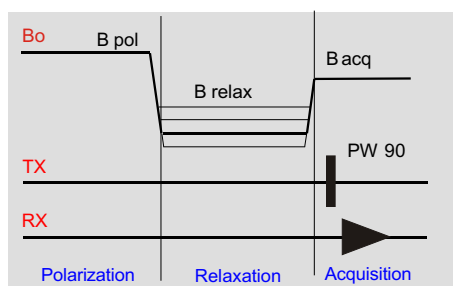
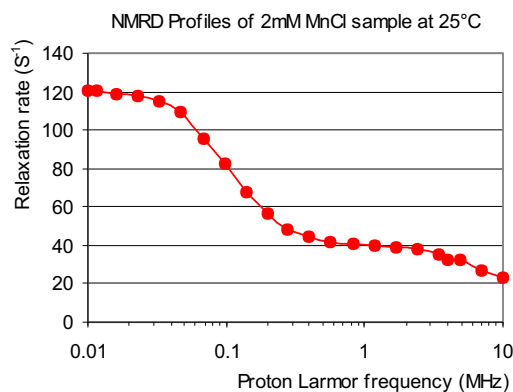
Windows 98,NT, WIN2000, XP NMR package for system control, acquisition and data evaluation and export

POWER SUPPLY

Max Power of system : 1300 W
230/115VAC 50/60Hz

DIMENSIONS AND WEIGHT

82x52x57cm - 32x21x23 inches - Weight 75 Kg
The magnet and power supply are cooled by means of a commercial chiller (no water needed)



The Field Cycling NMR relaxometry

With the ongoing growth of studies of complex systems in biochemistry and materials research, we witness an increasing interest in NMR relaxometry and, in particular, in variable-field relaxometry. All NMR studies exploiting nuclear relaxation indicate the convenience of measuring nuclear relaxation time (T_1) as a function of the magnetic field B_0 in which they occur (NMRD profile). Since such "dispersion" curves retrace essentially the distribution of molecular motions in terms of frequency (the so called spectral densities), they provide an unusually direct way to "sampling" such distributions. Quantitative evaluations lead to important data about the interactions which couple molecular motions with nuclear spins. In order to fully exploit information of variable field relaxometry, the relaxation field values should cover a range of 4-5 orders of magnitude. Moreover measurements in extremely low fields are particularly interesting since they reflect very slow motions and one would like to cover, in a single experiment, field values ranging from a few kHz to tens of MHz (Proton Larmor frequency). It's evident that no conventional NMR spectrometer can produce such information.

The NMR Field Cycling method

In the basic NMR Field Cycling experiment the Zeeman field B_0 , which is applied to the sample, is cycling through three different values. In the first period, a high magnetic field **Bpol** (polarization field) is applied to pre-polarize the sample in order to boost signal intensity. Thereafter, the sample is allowed to relax in a second field **Brelax** (relaxation field) which can be set to any desired value, including zero. In the last period the field is set to the detection field **Bacq** for signal acquisition.

Contact Stellar for more detailed specifications



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