

# Doty OptiMAS™ – Optimized for Demanding NMR

**Narrow bore only.  
Auto sample eject with drop in rotors.  
Cold zone cooled for increased sensitivity.**

## **New Spinning Options.**

**Now available – NEW DI3**  
(Drop In 3 mm)  
or DI4 (Drop In 4 mm) rotors

*... for best sensitivity.*

**Highest S/N –55% Gain in S/N**  
by cooling the cold zone and  
using cooled or low noise  
preamps.

*... for ease of use.*

**Automatic sample eject –**  
remove rotors without  
lowering the probe.

*... for high resolution MAS.*

**Optimal solids probe resolution**  
(1 Hz at 600 MHz).

*... for gradient spectroscopy  
and diffusion.*

**Magic Angle Gradient  
(MAG) Coil**  
(500 G/cm at 500 MHz).

*... for stable spinning.*

**Axial vibrations**  
**under 2 microns rms** at  
moderate speeds.

*... for thermally labile samples.*

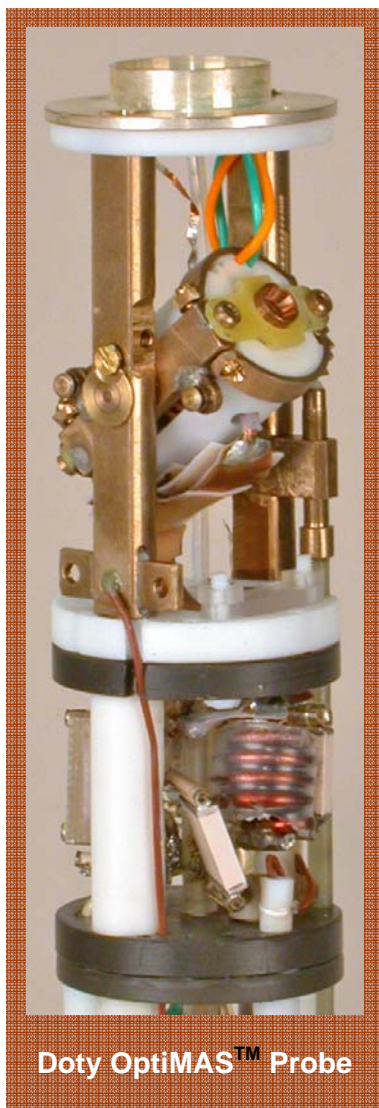
**Order-of-magnitude lower  
decoupler heating**  
compared to solenoid only.

*... for homonuclear decoupling.*

**Minimal phase transients.**

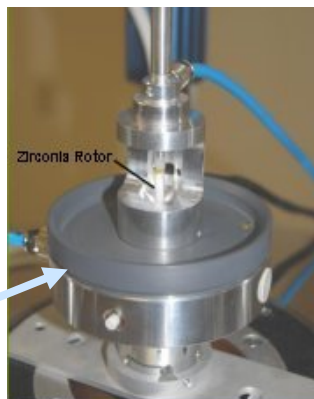
*... for multinuclear versatility.*

**Double-broadband  
X & Y channels.**



# Doty OptiMAS™

## Automatic Sample Eject



## New OptiMAS™ Probe Spinning Options

- Auto Sample Eject with **DI-3** (Drop-In 3 mm) Spinner  
Maximum Spinning 30 kHz.
- Auto Sample Eject with **DI-4** (Drop-In 4 mm) Spinner  
Maximum Spinning 18 kHz.

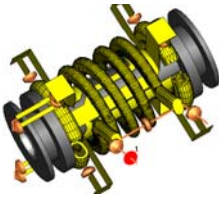
## 55% Gain in S/N with Cooling in OptiMAS™ ... AND High Resolution

OptiMAS™ probe with DI-4 spinner and low noise (or cooled) preamps. Cooling the low-frequency and mid-frequency high voltage plug-in capacitors to 100 K with nitrogen provides major improvement in signal to noise. "Cold Zone" cooling contributed 42% and cooled preamps contributed 13% to the gain in S/N.

OptiMAS™ Probe Glycine CP/MAS Spectra 70 kHz decoupling, <sup>1</sup> H at 300 MHz		OptiMAS™ With MAG <sup>1</sup> H Resolution Spectrum at 300 MHz
A: "cold zone" at RT System NF = 1.1 dB	B: "cold zone" at -180°C System NF = 0.7 dB. Gain in S/N = 55%	Water Spectrum FWHM = 0.6 Hz, 8 Scans

# Doty MAS Means Performance

## Doty MAS *Two-coil* Method: <sup>1</sup>H Cross Coil & X/Y Solenoid



### *What is a cross coil?*

The cross coil is a “saddle-type” coil that has an inner one-turn loop in parallel with a segmented turn on each side.

### *Why use two coils?*

Using two orthogonal coils simplifies tuning and permits higher RF fields in larger samples and very high  $B_0$ .

### *How does this help ?*

The low inductance cross coil contributes much less to sample heating during decoupling. Compared to a solenoid, it's a factor of 6-25 times less!!

## Lowest Decoupler Heating

110 kHz decoupling fields at 750 MHz with 6-25 times lower sample heating compared to solenoid-only probes. Stable tuning, low heating, high sensitivity, and excellent  $B_1$  matching on both coils, even for lossy samples. Unlike many other sample coil designs, the  $B_1$  homogeneity of the XC coil is not significantly affected by the sample because of its inherent electrical balance, symmetry, and very low inductance.

*Reference: F. D. Doty, J. Kulkarni, C. Turner, G. Entzminger, A. Bielecki, J. Magn. Reson., 2006, 182, 239-253.*

## Triple-resonance, Double-broadband Tuning

- **H-F/X/Y in wide or narrow bore magnets.**
- **H/X/Y/lock in wide bore, H/X/lock in narrow bore.**
- **H/F/X in wide bore or narrow bore.**

Maximize versatility with multinuclear, X and Y channels even in probes with <sup>1</sup>H resolution optimized – to 0.003 ppm FWHM.