

The Resonator

Some of Doty Scientific's 3 Decades of Achievements

1982	➤ 7 mm MAS at 5 kHz
1982	➤ Triple Tuned MAS
1983	➤ Single-Crystal Goniometer Probes
1984	➤ Multinuclear Observe for Solids
1985	➤ 19 mm MAS
1987	➤ Cramps Probes
1987	➤ Actively Shielded Gradient Probes
1987	➤ "Supersonic" 5 mm MAS at 17 kHz
1987	➤ 1000 G/cm Pulsed Field Gradient
1987	➤ 7 mm MAS at 9 kHz
1988	➤ 650°C CP/MAS
1989	➤ Precision Temperature Controller
1990	➤ Dynamic Angle Spinning
1991	➤ 14 mm MAS at 7 kHz
1992	➤ 300°C Pulsed Field Gradient Probe
1992	➤ 10 mm MAS at 10 kHz
1992	➤ Doty DOR and DAS Probes
1993	➤ Force-Cancelled Gradient Coils
1997	➤ XC5 Cross Coil – PROTON_{MAX} (First Low-E MAS Probe)
1998	➤ Doty Litz rf Imaging Coils
1999	➤ XC4 (4 mm spinning 24 kHz)
2002	➤ 930 MHz Triple-resonance MAS
2002	➤ Small Animal Imaging Platforms
2004	➤ 700°C CP/MAS
2006	➤ OptiMAS, DI-4 (Drop-In 4 mm) Spinner and Auto Sample Change
2008	➤ Hall-effect Precision SAS
2010	➤ DI-3 Spinners – Spinning 28 kHz
2010	➤ Shipped First CryoMAS Probe
2012	➤ B_{MAX} – the ultimate, low-cost, high-performance CP/MAS probe

... A Great Big Thank You



Over the years we have dedicated ourselves to treating our customers as our friends and to providing them with the most creative and highest quality products we can offer at the best price possible. We have not strayed from that principle, and we humbly thank all of our friends, customers, and loyal employees for their continued support.
– David and Judy Doty



Did You Know?

Doty Scientific makes exceptionally stable H/F dual-channel MRI imaging modules for small animals and body extremities?

Did You Know?

If you're using a 2.5 mm MAS probe, the new Doty 3-mm B_{MAX} probe will probably allow you to double your S/N, increase your VT range, achieve higher RF field strengths, and spin just about as fast.

Constant Improvement

Doty Scientific is constantly advancing all aspects of solids NMR probe technology – S/N, rf field strength, reliability, ease of use, VT range, spinning speeds, background signals...

A Little History...

In May of 1982, with not much more than a lot of dreams, a few pieces of equipment, boundless determination, and hundreds of parts accumulated from the TV-repair business that had supported the Doty's during graduate school, Doty Scientific, Inc. was formed and moved into a small commercial building in Columbia, SC USA. Within a few months, DSI introduced the first Doty Solids Probe – a 7-mm MAS Probe that could stably spin 5 kHz without the need for airport-rated ear plugs!

David Doty grew up on a small farm in north-western Indiana, where from 5th grade on he milked the cows and fed the chickens every morning before school. Before he had completed 7th grade, he had rebuilt tractors, trucks, centrifugal cream separators, watches, and radios – and had read cover-to-cover the 12-volume Encyclopedia of Science his uncle had given him.

After finally figuring out he wasn't meant to major in his other life interests, music or theology, Dr. Doty focused on physics and finished his PhD in May of 1983. Since 1982, DSI has produced more innovative products than can be listed in the timeline above. Over the last thirty years many key employees, friends, and mentors have played instrumental roles in DSI's successes and have also helped to shape the company's future. In this and subsequent newsletters we will highlight some of these people, some of the exciting new developments we're working on, and we'll include a featured product in each issue. We thank you for your continued support, and hope you enjoy!

The Resonator

UHF HV Capacitor Advances

Many of the capacitors we're using today in high-power probe circuits have over twice the Q above 400 MHz compared to the best high-voltage capacitors available just two years ago. If these commercially available capacitors are inadequate for a critical application, we make our own.

Important Factors When Purchasing a Solids Probe

1. Do you expect to be doing long acquisitions with [high-power decoupling](#) at over 400 MHz on lossy samples? If so, then you don't want a probe in which the ^1H field is generated by a solenoid. Any of the alternative coil designs will work much better.
2. Will you need two channels (H/X) or three (H/X/Y) ?
3. Is proton efficiency or X/Y performance the most important for your experiments? (Doty's new [B_{MAX}](#) probe is optimized for X/Y performance, while the [PROTON_{MAX}](#) is optimized for the proton channel.)
4. How fast do you need to spin? The DI-3 spins 28 kHz, compared to 18 kHz for the DI-4, but the DI-4 may give you nearly twice the S/N.
5. What nuclides are of interest on the X/Y channels?
6. What temperature range do you need?

(Doty sample-temperature options range from -170°C to $+700^\circ\text{C}$.)

Did You Know?

Doty Scientific makes HR liquids probes... especially for 8-25 mm samples. Doty also makes HR probes with unique tuning requirements.

Routine CryoMAS is Getting Close

The first [CryoMAS](#) probe with cryogenically cooled coils for room temperature samples was shipped Nov. 2010.

George Entzminger, J.B. Spitzmesser, and David Doty here are examining the CryoMAS probe shortly before it was completed.



J.B. Spitzmesser joined Doty Scientific in its first year, 1982. George Entzminger joined the company in 1986.

Featured Product

NEW PRODUCT FOR 2012

B_{MAX} MAS Probes – 3 mm or 4 mm

- **Highest S/N – by a wide margin**
DI-4: 205:1 on 50 mg of glycine, ^{13}C , 11.7 T
DI-3: 258:1 on 18 mg of HMB, ^{13}C , 11.7 T
- **Highest RF field strengths on X/Y**
Compare: $1.3\ \mu\text{s}\ \pi/2$ with only 640 W for ^{13}C , DI-3 at 11.7 T, H/X
- **H-F/X/Y broad-band tuning**
Tuning options from ^{109}Ag to ^{31}P
- **Three Year Limited Warranty!**

