DOTY SCIENTIFIC

The Resonator

NMR - MRI Newsletter Winter 2015

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UPCOMING CONFERENCES

TUE 15 DEC 2015 - SUN 20 DEC 2015

The 2015 International Chemical Congress of Pacific Basin Societies (PAC CHEM™)
Honolulu, Hawaii, USA.
www.pacifichem.org

David and Judy Doty and Laura Holte will be attending. Catch David Doty's talk on Tuesday December 15th at 4:45. "Closed-Loop MAS-DNP-NMR at 30 K for Affordable Dramatic Gains in S/N"

SUN 10 APR 2016 - FRI 15 APR 2016

57th ENC
Wyndham Grand Hotel,
Pittsburgh, Pennsylvania
www.enc-conference.org

DEAR COLLEAGUE,

We have lots to be thankful for at Doty Scientific.

SBIR Grant …
In September, Doty Scientific received a Phase II SBIR grant from NIH for Development of "Closed-Loop CryoMAS-DNP-NMR at 30 K for Affordable Dramatic Gains in S/N".

We are particularly grateful continued orders and support from the NMR community. We would like to say Thank You.

On a personal note …

Many of you expressed concern for us after the "1000 year flood" in Columbia, SC, when the area received 18 to 20 inches of rain in less than 3 days in early October this year. Located on small hill, Doty Scientific was spared from any flood damage. All in all, our staff was also fortunate to have experienced little damage. We are well, and we thank you for your kind words.

Laura Holte attended the Alpine Solids NMR Conference in Chamonix France, Sept. 13-17. David and Judy Doty, and Paul Ellis attended the SEMRC in Daytona Beach, Florida, Oct 9-11. Both conferences provided the productive and enjoyable opportunity to meet with friends and colleagues, and to discuss new projects. Back in Columbia, we continue to focus intense efforts testing new advances that we will have more to say about later.

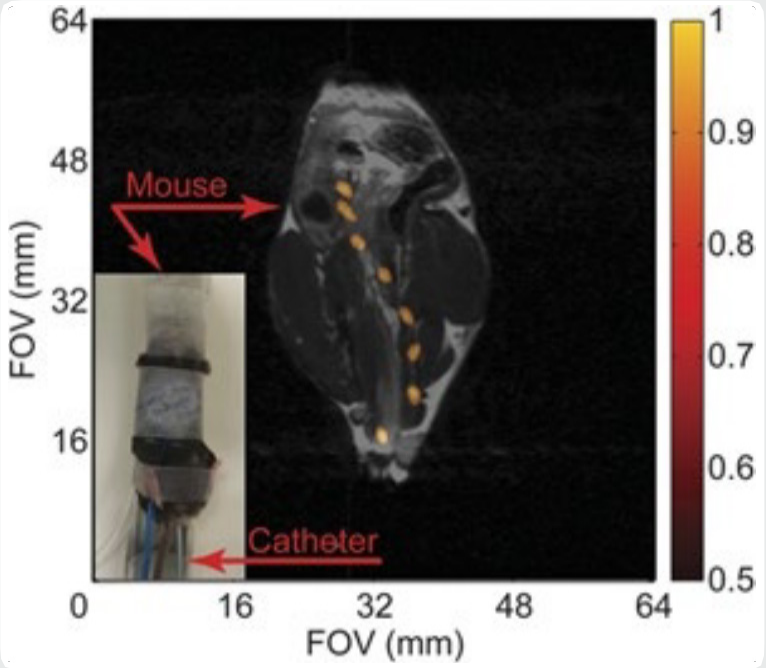
David and Judy Doty

USER SPOTLIGHT:

Hyperpolarized ^{29}Si MRI at MD Anderson Cancer Center

Whiting, N. et al. Real-Time MRI-Guided Catheter Tracking Using Hyperpolarized Silicon Particles. Sci. Rep. 5, 12842; doi: 10.1038/srep12842 (2015). www.nature.com/articles/srep12842

Researchers at MD Anderson Cancer Center are developing a magnetic resonance imaging-guided catheter tracking method that utilizes hyperpolarized silicon particles and a Doty dual frequency ^{1}H/^{29}Si 7 T Litz volume coil for mouse. The increased signal of the silicon particles is generated via low-temperature, solid-state dynamic nuclear polarization, and the particles retain their enhanced signal for ≥40 minutes—allowing imaging experiments over extended time durations. With continued development, this method has the potential to supplement x-ray fluoroscopy and other MRI-guided catheter tracking methods as a zero-background, positive contrast agent that does not require ionizing radiation.



Figure, above:

Hyperpolarized ^{29}Si particle MRI-tracking in vivo. Composite of ^{29}Si images (co-registered with single 1H anatomical scan) showing transit of angiocatheter loaded with silicon particles through the large intestines of a live normal mouse (picture inset) over the course of 4 min. Absolute ^{29}Si signal intensities are denoted in arbitrary units on the colored scale; greyscale denotes 1H intensities. It should be noted that ^{29}Si MRI scans were completed with single scans (no averaging needed).

Special thanks to Pratip Bhattacharya, PhD, Dept. of Cancer Systems Imaging, Univ. Texas MD Anderson Cancer Center, Houston, TX.

NIH/DOE/NSF WORKSHOP: ULTRA HIGH FIELD (UHF) NMR AND MRI

Tatyana Polenova and Thomas Budinger lead a seminal workshop in Bethesda, MD on November 12-13 to highlight the revolutionary-type progress that has been made in superconductor wire for UHF magnets over the past five years and the vital role UHF NMR can play in addressing hard-to-solve problems in all areas of science, particularly biochemistry, medicine, and catalysis.

It was an honor to be invited to participate in this "who's who" event of distinguished leaders giving exciting presentations on the fore-front of high-field NMR applications in their areas. From the presentations, it was clear that the technology (magnet wire, magnets, probes, consoles…) is ready to respond to the science drivers with NMR at 1.2 GHz in the near term and 1.8 GHz a decade from now – if the funding mechanisms can be found. One of the goals of this group is to put together the kind of convincing case it will take to get Congress to appropriate the budget needed over the coming decade to allow UHF NMR to provide break-through solutions for Alzheimer's disease, cancer, and other major societal health costs. This will not be easy in the current U.S. funding climate, but we are hopeful.