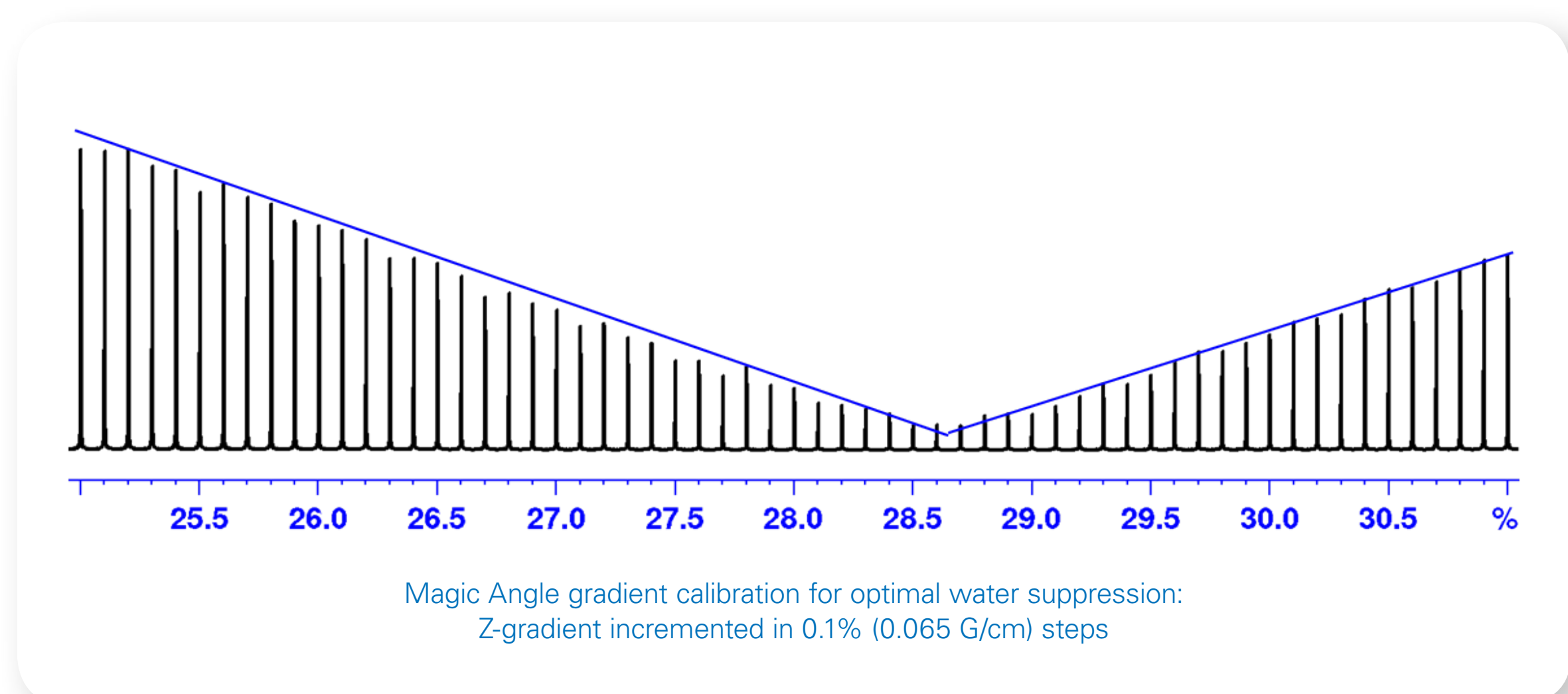


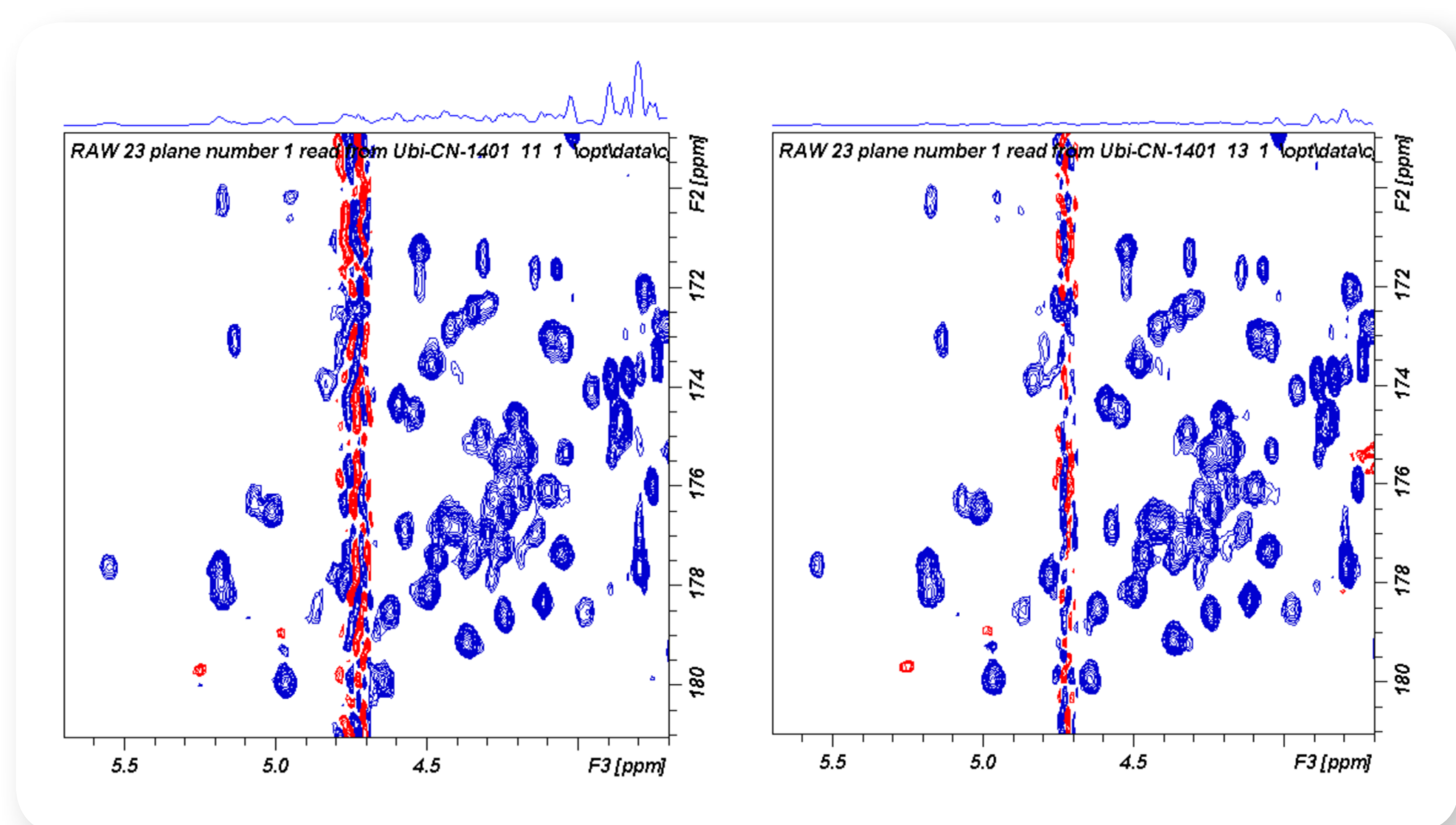
Triple Axis Pulsed Field Gradients

The portfolio of Helium cooled CryoProbes offers optimally suited probe types for many areas of applications. For NMR method development a triple axis gradient can be ordered as an option for new 5mm TCI CryoProbes. Triple axis gradients enable faster development of pulse sequences: accidental residual water signal refocusing is easily avoided when employing different pulsed field gradient axis or gradients at the magic angle throughout the sequence. Unwanted coherences, such as residual water, are suppressed with increased efficiency.



Minimizing the Water Resonance in Biological NMR: Characterization and Suppression of Intermolecular Dipolar Interactions by Multiple-Axis Gradients.

Debra L. Mattiello, Warren S. Warren, Luciano Mueller, and Bennett T. Farmer II, J. Amer. Chem. Soc. 1996, 118, 3253-3261



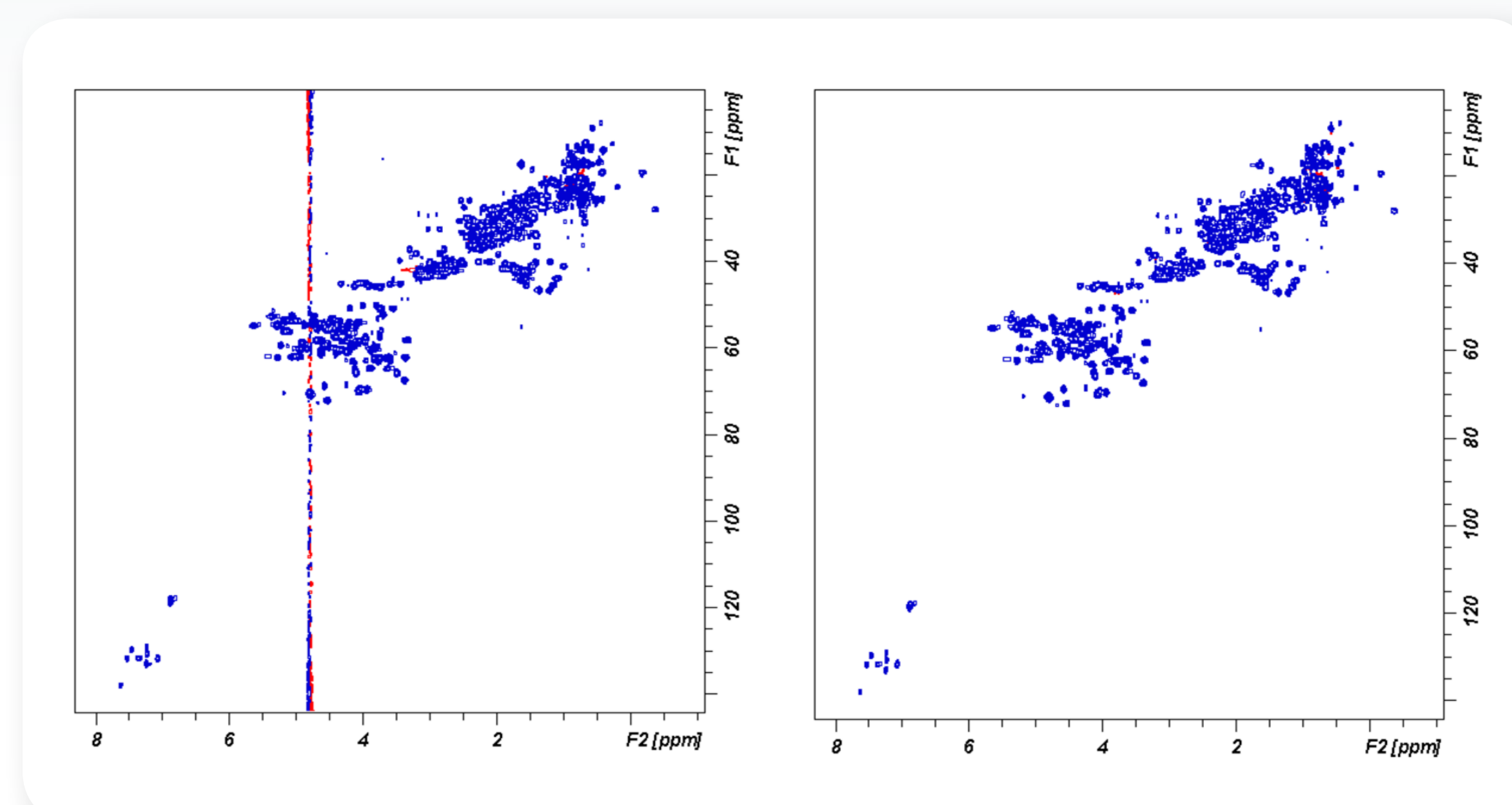
2D ^1H - ^{13}C O planes of 3D HCACO: with all gradients along the Z-axis (left) and using magic angle gradient (right) for coherence selection.

^{15}N Direct Detection: Cold Preamplifier Electronic

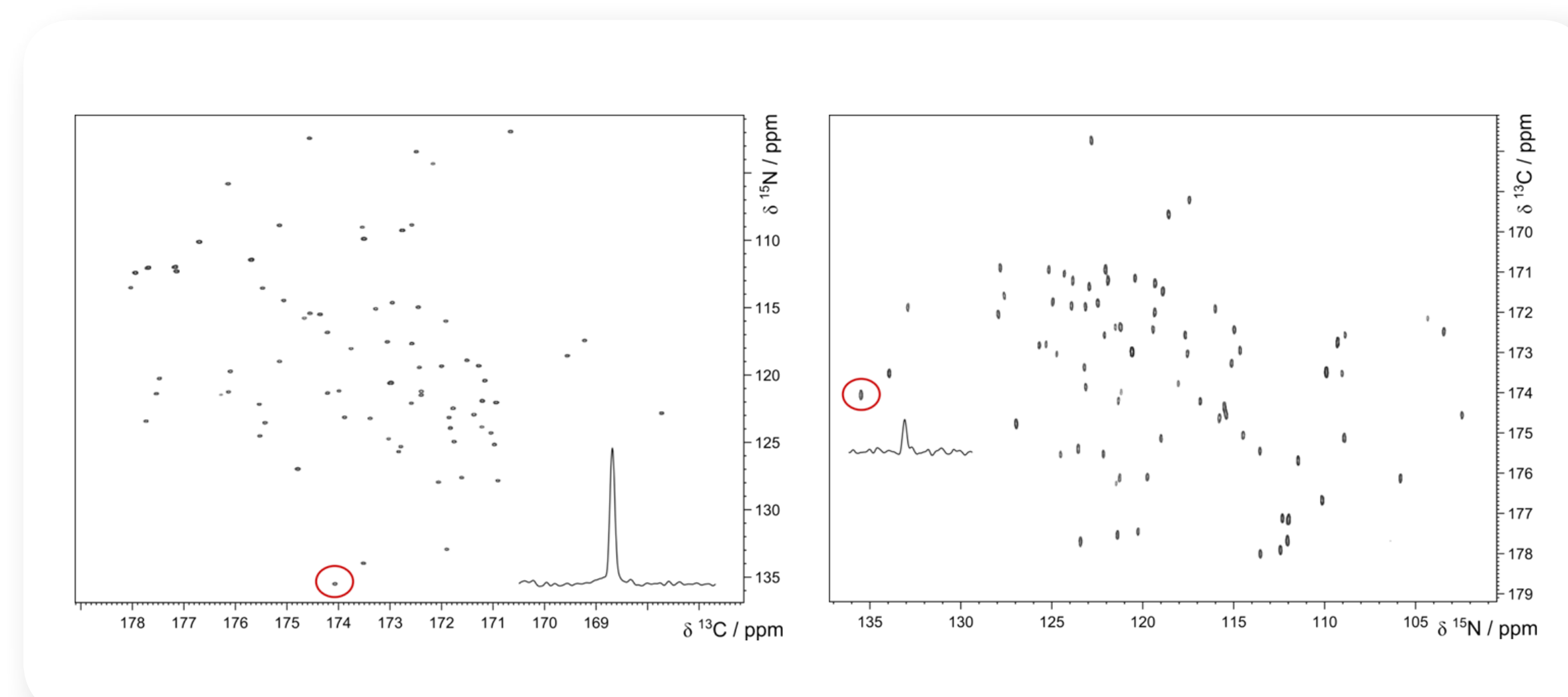
Direct X-nucleus detection has become increasingly popular as a complementary technique for solving many bio-molecular problems with NMR and it has been established as a unique high performance tool for the studies of paramagnetic proteins and Intrinsically Disordered Proteins (IDP's).

Also, pushing the molecular size limit, direct ^{15}N detection despite its inherently lower sensitivity can become competitive to ^{13}C detection, as shown by Wagner et al. (J Biomol NMR, 2011, 51, 497–504).

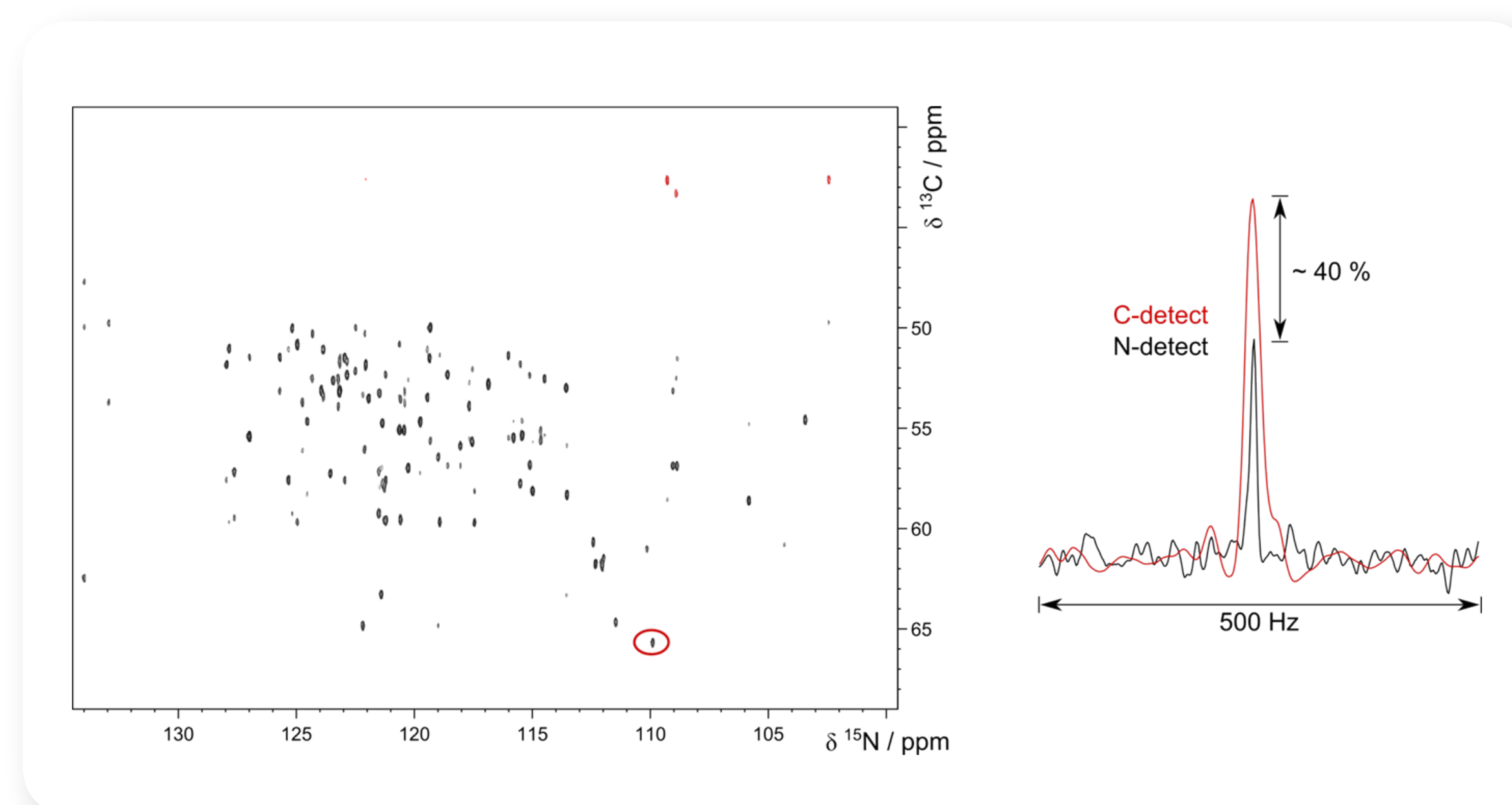
New 5mm TCI and TXO helium cooled CryoProbes can optionally be equipped with active ^{15}N preamplifier electronics, increasing ^{15}N sensitivity by a factor of 2 and thus reducing experimental time by a factor of 4!



^1H - ^{13}C HSQC with all gradients along the Z-axis (left) and using magic angle gradient (right) for coherence selection.



^{13}C (left) and ^{15}N (right) detected N-CO correlation at 20T (850 MHz ^1H frequency, ubiquitin). Sensitivity difference $\sim 5\times$ without active ^{15}N preamplifier, ~ 2.5 with cold ^{15}N preamplifier.



^{15}N detected (left) (H)CAN (J Biomol NMR, 2011, 51, 497–504) experiment at 20T. Comparison of signal intensity for indicated cross peak, ^{13}C detection vs. ^{15}N detection.

Summary

- Triple axis pulsed field gradients for 5mm TCI.
- Active ^{15}N preamplifier electronics for 5mm TCI and 5mm TXO CryoProbes.

