



FT-EPR Digital Upgrade

- The Latest Digital Technology for your ELEXSYS E500

The ELEXSYS spectrometer line is well-known for exceptional performance in advanced EPR. As technology evolves, digital upgrade pathways have been developed to equip the ELEXSYS with the latest digital technology, to meet the demands of cutting-edge pulse EPR research.

Take your ELEXSYS transputer/OS9 system to the next level, joining the new digital generation of FT-EPR spectrometers.

The Digital Upgrade Package brings your spectrometer up-to-date for both CW- and FT-EPR, with improvements in:

- Resolution
- Usability
- Stability
- Tolerance
- Sensitivity

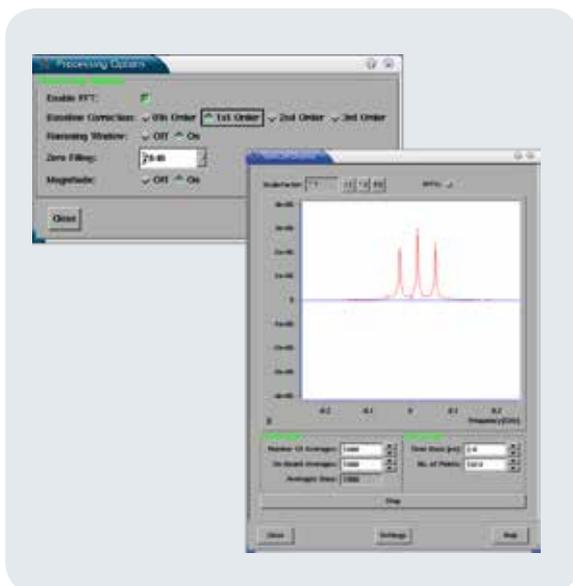
● FT-EPR Digital Upgrade

PatternJet-II

Building on the high performance features of the original PatternJet-I, PatternJet-II includes extended memory on each channel for more pulses and more evolution times, with no reprogramming overhead.

Features

- Maximum time resolution of 1 ns
- 1024 pulses per channel
- Direct phase cycling without reprogramming
- Direct 2D acquisition without reprogramming overhead



SpecJet-II

Combining high speed averaging and real time digital signal processing, SpecJet-II is the ideal digitizer for FT-EPR. In addition to optimizing EPR experiments in the time domain, SpecJet-II utilizes DSP for optimizing and collecting experiments in the frequency domain.

Features

- Time resolution from 1 ns to 10 ms
- 65536 on-board averages
- Real time digital signal processing
- Real time FFT set up mode

High Speed Data Acquisition

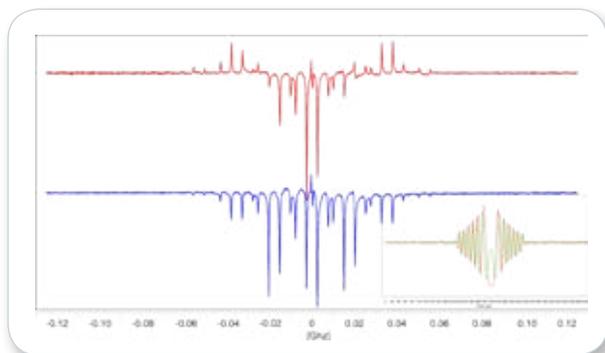
The combination of PatternJet-II and SpecJet-II delivers an unprecedented increase in experiment efficiency and flexibility.

Direct Phase Cycling

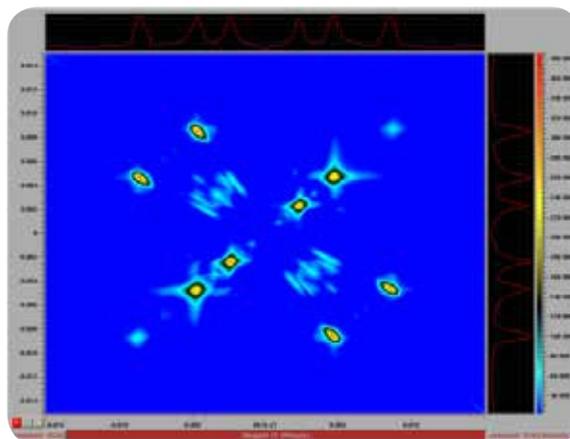
The overhead typically associated with phase cycling has been removed with the SJ-II/PJ-II combination. A 2-pulse ESEEM spectrum with a 16 step phase cycle, which used to take 10 s to acquire, can now be acquired in 0.8 s.

Multislice Acquisition

Rather than acquiring each slice of a 2D experiment individually, the SJ-II/PJ-II acquires multiple slices simultaneously. A 2D HYSCORE experiment that used to take 346 s can now be completed in just 70 s.



Shaped microwave pulses enable complete EPR spectrum inversion. Standard 13 ns square inversion pulse (top) and shaped 200 ns adiabatic inversion pulse (bottom). Inset: real and imaginary components of adiabatic inversion pulse.



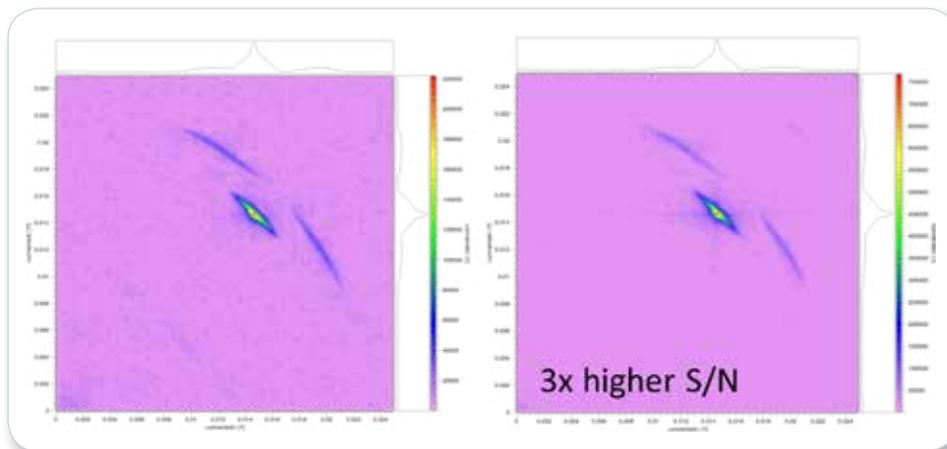
2D experiments such as this HYSCORE spectrum can now be completed in a fraction of the time with the SpecJet-II and PatternJet-II.

SpinJet-AWG

SpinJet-AWG is a leap forward in pulse EPR. Extensive MW pulse controls open up exciting new possibilities in experiment design and optimization.

Features

- Frequency definition of each pulse
- Pulse shaping within the shot
- Frequency chirping of pulses
- Phase definition of each pulse
- Multiple channel architecture



Chirped HYSCORE showing a factor of 3 improvement in S/N for the same measurement time. ¹H HYSCORE of nitroxide spin probe: 166 ns Chirped (± 113 MHz) inversion pulse (right) and 26 ns standard inversion pulse (left).

Upgrade Pathways



First Level

Digital Upgrade Package Step 1

Hardware components:

- Signal processing unit
- Field controller
- Ethernet MW bridge controller

Digital Upgrade Package Step 2

Hardware components:

- SpecJet-II
- PatternJet-II

Optional:

- DICE-II
- SpinJet-AWG

Xepr Software Suite:

- PC with LINUX® operating system
- LINUX acquisition server
- Xepr all-in-one interface for data acquisition, device control and data processing
 - XeprAPI to interface with Python® scripts for enhanced control and processing
 - FT-EPR:
 - Up to 1024 pulses per PatternJet-II Channel
 - Direct phase cycling for reduced acquisition time
 - Multislice acquisition for even faster 2D experiment acquisition
 - Real time FFT set up mode
 - CW-EPR:
 - Extensive 2D experiment support
 - SpinCount: Quantitative EPR with high precision and minimal user interaction
 - No need for a reference sample
 - SpinFit: Spin trap fitting routine for identification and quantification of radical adducts

Second Level

New Microwave Pulse Bridge

Modern microwave pulse bridge featuring:

- Standard 4 phase pulse transmitter
- Frequency counter lock
- Full digital control

● **Bruker BioSpin**

epr@bruker-biospin.de
epr@bruker.com
www.bruker.com/epr