Ultra High Field Animal MRI Solution for Molecular and Preclinical Research

BioSpec 117/16 USR

The BioSpec® 117/16 has been designed to meet the needs of the emerging market of preclinical and molecular MRI. State-of-the-art MRI CryoProbe™ technology, together with its ultra high field USR magnets, deliver high spatial resolution in vivo, enabling customers to come closer to the molecular and cellular level of research they desire. Thanks to its innovative modular concept, virtually any small animal MR imaging application in life science, biomedical and preclinical research can be conducted. Whatever your application, the BioSpec 117/16 will deliver the optimum solution, perfectly equipping you for the most demanding tasks and challenges.

Main Features:
- Ultra high field of 11.7 T with unsurpassed SNR
- USR magnets with two-year service intervals
- Helium zero-boil-off and nitrogen-free magnet technology
- 72 mm free access for imaging of rats and mice
- Integrated gradient and shim systems with the highest slew rates and gradient strengths with BGA-9S
- Scalable Avance™ III architecture for multiple receiver and transmitter channel configuration
- Phased array coil technology for parallel imaging
- AutoPac™ - motorized animal positioning system
- Routine software ParaVision® with state-of-the-art MR animal imaging and spectroscopy protocols
High Resolution Neuroanatomy

The BioSpec 117/16 USR system delivers routine rat brain imaging with outstanding image quality results. The signal-to-noise ratio obtained at this field strength enables the acquisition of high resolution images of the microscopic structures in the brain.

Magnets

The BioSpec 117/16 benefits from Bruker’s expertise in designing and manufacturing ultra high field superconducting magnets. Easy and cost efficient siting is guaranteed by minimum stray fields and compact magnet design. Active helium refrigeration and nitrogen-free cooling provides zero boil-off for reduced maintenance costs and increased service intervals.

Specifications at a Glance

- Magnet field strength: 11.7 T
- Diameter of clear bore: 16 cm
- Stray-field (5 Gauss): axial: ± 2.8 m, radial: ± 1.7 m
- Length: 1.5 m
- Diameter: < 1.7 m
- Weight: 7,000 kg

Gradient system BGA-9S with RT-shim and related power supplies Actively shielded gradients
Gradient amplitude: >740 mT/m
Slew rate: 6660 T/m/s
Linearity 60 mm DSV: < ± 5%

Cardiac Angiography

IntraAngio™ - High resolution self-gated steady state cardiac and lung cine angiography, achieved with a mouse.

Diffusion Tensor Imaging

Diffusion Tensor Imaging (DTI) benefits tremendously from the high signal-to-noise ratio that is achieved by the 11.7 T. Images taken in 14 minutes using an EPI-SE sequence are shown on the right: a rat brain diffusion weighted EPI image (left) and the corresponding color coded Eigenvalue image which displays the main principle diffusion directions after evaluating 30 different diffusion directions (right). Diffusion encoding: red: left-right; green: top-bottom; blue: in-out.

BOLD fMRI

High resolution BOLD activation acquired with single-shot EPI at 11.7 Tesla using the four-element coil array with a resolution of 75 x 75 x 1000 µm³ for detection of sub-structures. Increasing field strength provides higher S/N which when invested into higher spatial resolution provides not only access to finer details of sub-structures but also increases the BOLD amplitude (because of less “dilution” by partial volume effect)

Courtesy: M. Hoehn, MPI, Cologne, Germany

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