

Sr. No.	253
Name of Technology	NMR structures of membrane proteins, complexes and lipid assemblies; A dedicated wide-bore ultra high field MAS NMR spectrometer for biological research
Sector	PHARMACEUTICALS AND HEALTHCARE
Sub-sector	Diagnostic / Instrumentation
Keywords	Bore NMR spectrometer, highly homogeneous super-conducting magnet system
Inventor	Dr.Gerd Wolff
Phone	+49 (721) 5161-151
E-mail	gerd.wolff@bruker-biospin.de
Description	<p>A new ultra high field and wide bore NMR spectrometer operating at 17.6 Tesla (750 MHz proton resonance frequency) i.e. a system based on a newly developed highly homogeneous super-conducting magnet system with 89mm room temperature bore has been developed. The increase of field strength combined with the large access bore facilitate higher sensitivity and dispersion, essential for biological solid state NMR, including Magic Angle Spinning (MAS) and for magnetic resonance microscopy (microimaging). New improved pulse programming and pulse sequence execution capabilities were developed for this system as required particularly for the intended solid state experiments. A new generation of flat-coil solid state NMR probes and of triple resonance NMR probes, optimized for protein analysis at ultra high magnetic field at variable temperatures was realized. Furthermore, micro-imaging facilitates for applications involving small objects up to 30 mm diameter at ultra high field have been developed and implemented for applications involving small animal models (mice, fish, chicken embryos) e.g. to resolve the relationship between the genetic program and biological functionality. Since the system operates at highest magnetic field strength available for a wide bore configuration with imaging capabilities, it is the most powerful magnetic resonance microscope in the world. Furthermore, it represents the state of the art in the field of solid state NMR in the context of material and biological sciences. The system does not rely on any additional technology and is fully self-sustained. All these new products have immediately been made commercially available. Several orders for the new spectrometer have already been received. The groundbreaking results obtained during the demonstration project have in addition resulted in a dramatic increase in further scientific research in biological solid state NMR and in addition in a large interest in the new probe technologies for common solids NMR spectrometers and in high field solid state NMR spectrometers in general.</p>



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Application of Technology	This technology has applications involving small animal models (mice, fish, chicken embryos) e.g. to resolve the relationship between the genetic program and biological functionality.
Advantages	Marketing started as soon as the demonstrator was ready for measurements. The exploitation is successfully in progress, 6 system orders for the AVANCE750WB were already received till the mid of 2003. The typical application is in structural genomics, high resolution NMR imaging of animals and materials science such as in Nanotechnology and we already experience a strong interest in the new technology.
Status of Development	Already on the market.
Source	http://www.esastap.org.za

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