

Compact MRT – made for better education

PHYWE's latest product –
innovative, unique, and ideal for teaching purposes



Nuclear Spins

Relaxation Times

Spatial Encoding

Magnetic Resonance Tomography (MRT)

In 2003, the Nobel Prize was awarded for the development of magnetic resonance tomography – in 2012, PHYWE turns this technology into a fascinating learning experience!

In 1973, P.C. Lauterbur and Sir P. Mansfield developed the nuclear magnetic resonance technology further and turned it into a medical diagnosis tool. In the 21st century, magnetic resonance imaging is one of the most important medical diagnosis methods.



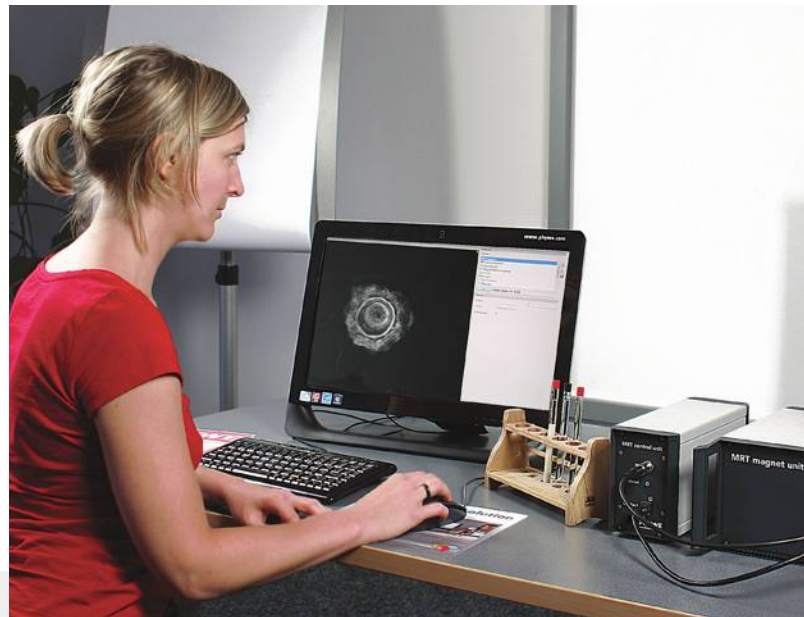
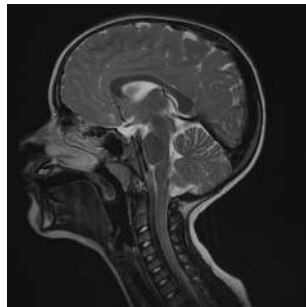
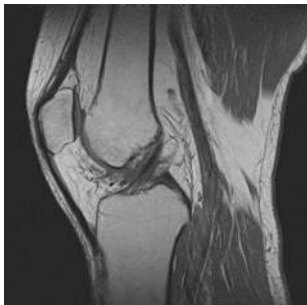
In 2003, Lauterbur and Mansfield were awarded the Nobel Prize in Medicine for their development.

Fascinating magnetic resonance technology

There is already a very high number of studies in the field of magnetic resonance and this number is growing drastically day by day.

Although this technology increasingly establishes itself and is highly successful, there is one aspect of it that has been largely neglected in the past. This is the aspect of education and training!

How can a comparably complex and sophisticated technology as nuclear magnetic resonance actually be conveyed in a valuable didactic manner?



19th century
J. J. Larmor (1857-1942)

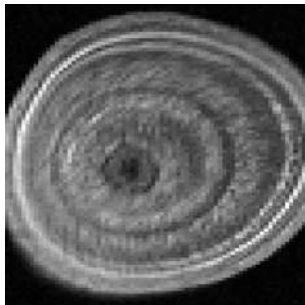
The angular frequency is proportional to the strength of the magnetic field

Fascinating magnetic resonance tomography – application in the field of education

PHYWE's Compact MRT is a world first – specifically adapted to practical courses and lectures. In terms of its major aspects, the entire technology can be compared to that of large MRI scanners.

All of the parameters and methods that are important for the MR technology are introduced and applied in a didactically valuable learning environment. This is the only way to provide students at schools and universities as well as apprentices and trainees with a thorough understanding of magnetic resonance tomography that will benefit them throughout their lives.

Apart from the professional, modern, and unique technology, the Compact MRT is especially compelling regarding its high level of safety, innovative software solution, intuitive user guidance, and perfectly adapted range of accessories.



Qualität made in Germany!



The magnetic resonance technology can be used in a versatile and universal manner in the field of education.



1952
F. Bloch (1905-1983)
E. M. Purcell (1912-1997)

Discovery of nuclear spin resonance, a method for measuring magnetic fields in atomic nuclei

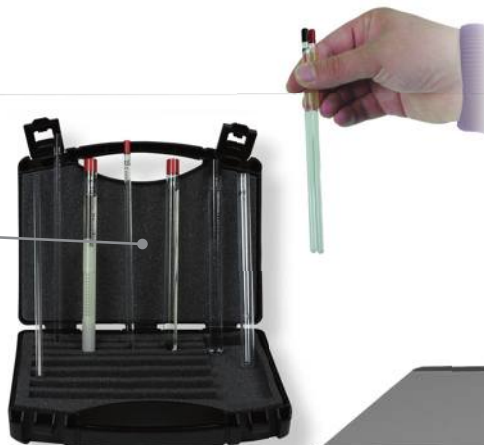


Compact MRT – details at a glance

The new and unique Compact MRT by PHYWE is more than just a device. It is a fascinating experience!

Extensive set of samples

- several example samples in a sample case
- oil and water samples to imitate fat and cerebrospinal fluid
- empty test tube for the analysis of own samples



MRT magnet unit

- powerful magnet with a field strength of 500 mT
- high field homogeneity < 100 ppm
- enables resolutions ~ 0.03 mm
- high level of shielding (at a distance > 1 m, hardly any magnetic field can be measured)
- lightweight ~17.5 kg
- compact design 27 cm x 25 cm x 14 cm
- sturdy transport handles



Clear connection

- easy to connect and immediately ready for use (BNC, RJ45, USB 2.0)
- all cables included
- optional sound box between the MRT magnet unit and MRT control unit for realistic MR sounds



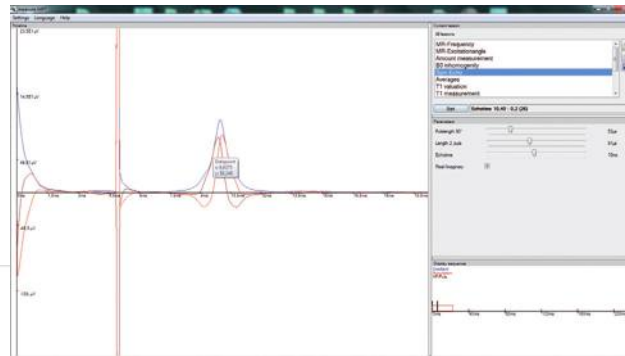
1991
R. R. Ernst (1933-)

High-resolution 2D NMR spectroscopy, a method for the analysis of molecular structures



MRT control unit

- clear, central control unit
- connector for the MRT magnet unit (BNC, RJ45)
- power supply in the standard range (12 V DC, 2 A)
- USB connection to the measurement computer
- lightweight ~2.3 kg
- compact design 27 cm x 9.5 cm x 14 cm
- status LED



measure MRT

- software package for measurements and evaluations
- easy to install
- clear structure
- selection of lessons and courses
- real-time parameter check
- export into all standard file formats (DICOM, JPEG, CSV, TXT)
- high-resolution 2D and 3D tomography
- well-structured help functions



Transport case

- trolley case for excellent mobility and safe transport (lockable)
- board case for safe transport in planes



Here at PHYWE, our products must meet the highest requirements and the Compact MRT is no exception.



2003
P. C. Lauterbur (1929-2007)
Sir P. Mansfield (1933-)

Further development of the nuclear magnetic resonance (NMR) principle into a medical diagnosis technique (MRT)



Fascinating magnetic resonance tomography – a convincing system solution

PHYWE is a globally leading supplier of integrated package solutions for science- and technology- focussed education at schools, universities, and institutes. Not just the individual product or experiment, but rather the customised adaptation of the entire offer to specific curricula and degree programmes provide the user with added value and additional benefits.

The Compact MRT by PHYWE follows this philosophy. The hardware (A) combined with the “measure MRT” software package (B) for the external control and measurement data acquisition, handbooks (C) with an extensive collection of reference experiments and a precise theoretical background as well as a comprehensive range of accessories (D) with a Quick Start Guide, software manual, and operating instructions are all a part of the basic equipment.

A PHYWE Compact MRT

- 500 mT magnetic field strength
- technology comparable to that of large MRI scanners
- possible resolution ~ 0.03 mm
- compact, easy to transport
- easy to connect and immediately ready for use
- easy exchange of samples, also during the measurements
- real-time check of all of the relevant parameters

B measure MRT software package

- easy to install
- easy to use, clearly structured into several partial areas
- free arrangement of the partial areas
- selection of courses
- real-time check of all of the relevant parameters
- export of the results in the DICOM, JPEG, CSV, or TXT format
- various integrated analysis tools

C Reference experiments

TESS expert handbook

- clearly structured experiment descriptions with colour photos
- detailed theoretical background on a high level
- evaluation examples with reference measurements and didactic transfer

D Accessories

- BNC, RJ45, USB cables, sound box, Quick Start Guide, software manual, operating instructions, sample set, transport case



Compact MRT – details and technical data

The scope of supply of the Compact MRT (09500-99) includes:

- MRT magnet unit
 - MRT control unit
 - measure MRT software package
 - sound box
 - trolley case
 - board case
 - sample set
 - BNC cable, 2x RJ45 cable (gradient, gradient for the sound box)
 - USB-AB connecting cable
 - mains power supply cable (100-240 VAC, 50/60 Hz, 2A)
 - Quick Start Guide
 - TESS expert experiments
 - Software manual
 - operating instructions
- } TESS expert handbook
(German: 01233-01,
English: 01233-02)

MRT magnet unit

- 500 mT field strength
- field strength homogeneity < 100 ppm
- shielding of the magnetic field:
 - distance ~ 100 cm: magnetic field strength < 0.2 mT
 - distance ~ 50 cm: magnetic field strength < 0.3 mT
 - general: the stray field is the strongest directly above the magnet
- sample diameter 10 mm
- connection of the imaging unit (gradient) via RJ45
- connection of the transmitter/receiver unit via BNC
- dimensions (length x width x height): 27 cm x 25 cm x 14 cm
- weight: 17.5 kg

MRT control unit

- connection of the imaging unit (gradient) via RJ45
- connection of the transmitter/receiver unit via BNC
- power supply 12 V DC, 2 A
- power supply unit (external) 100-240 V AC, 50/60 Hz, 2 A
- USB-B connection to the measurement computer
- status LED
- dimensions (length x width x height): 27 cm x 9.5 cm x 14 cm
- weight: 2.3 kg

measure MRT software package

- control of the control and magnet unit
- in German and English
- licensed by PHYWE, free updates available at www.phywe.com
- available on DVD or other data carriers
- free configuration of the user interface
- various setting options
- real-time check of all of the relevant MR parameters
- various integrated analysis tools
- export as DICOM, JPEG, CSV, or TXT files
- loading of data sets

System requirements

Windows XP (32/64 bit), Windows Vista (32/64 bit),
Windows 7 (32/64 bit), processor as of Intel Atom 1.6 GHz,
1 GB of free RAM or more, 256 MG graphics or more, compatible with
DirectX 9.0, USB 2.0

Sample set

- including 10 mm oil, 5 mm oil, 10 mm water, 5 mm water, 10 mm structure sample, 10 mm test tube
- in a plastic case with a special foam inlay that is specifically adapted to the samples
- the empty test tube can be used to analyse any types of samples with a diameter < 10 mm
- weight: ~ 300 g
- dimensions (length x width x height): 19 cm x 14.5 cm x 4 cm
- optional 3D sample with PHYWE signature

Trolley case

- sturdy transport case with foam inlays and castors
- robust telescopic handles
- lockable
- weight: ~ 11 kg
- dimensions (length x width x height): 64 cm x 36 cm x 29 cm

Board case

- consisting of 2 boxes (internal steel box, external flight box)
- internal steel box: lockable, weight ~ 16 kg, dimensions (length x width x height) 64 cm x 36 cm x 29 cm
- external flight box: lockable, with lifting slots for forklift trucks, weight ~ 37 kg, dimensions (length x width x height) 91 cm x 43 cm x 56 cm
- packaging in accordance with IATA 902 and Packing Instructions 953 (Dangerous Goods Panel "DGP", version 2008)

Cables

- 1 x 50 cm, 50 ohm BNC cable
- 2 x 50 cm RJ45 cable
- 1 x 180 cm USB-AB connecting cable
- 100-240 V AC cable

Certifications, approvals, legal regulations

EMC Directive 2004/108/EC (electromagnetic compatibility)

Compliance with the following product standards:
 DIN EN 61000-6-1; VDE 0839-6-1:2007-10
 DIN EN 55011; VDE 0875-11:2011-04:2011-04
 DIN EN 61000-4-2; VDE 0847-4-2:2001-12:2001-12
 DIN EN 61000-4-3; VDE 0847-4-3:2008-06:2008-06
 DIN EN 61000-4-5; VDE 0847-4-5:2007-06:2007-06
 DIN EN 61000-4-6; VDE 0847-4-6:2008-04:2008-04
 DIN EN 61000-4-11; VDE 0847-4-11:2005-02:2005-02

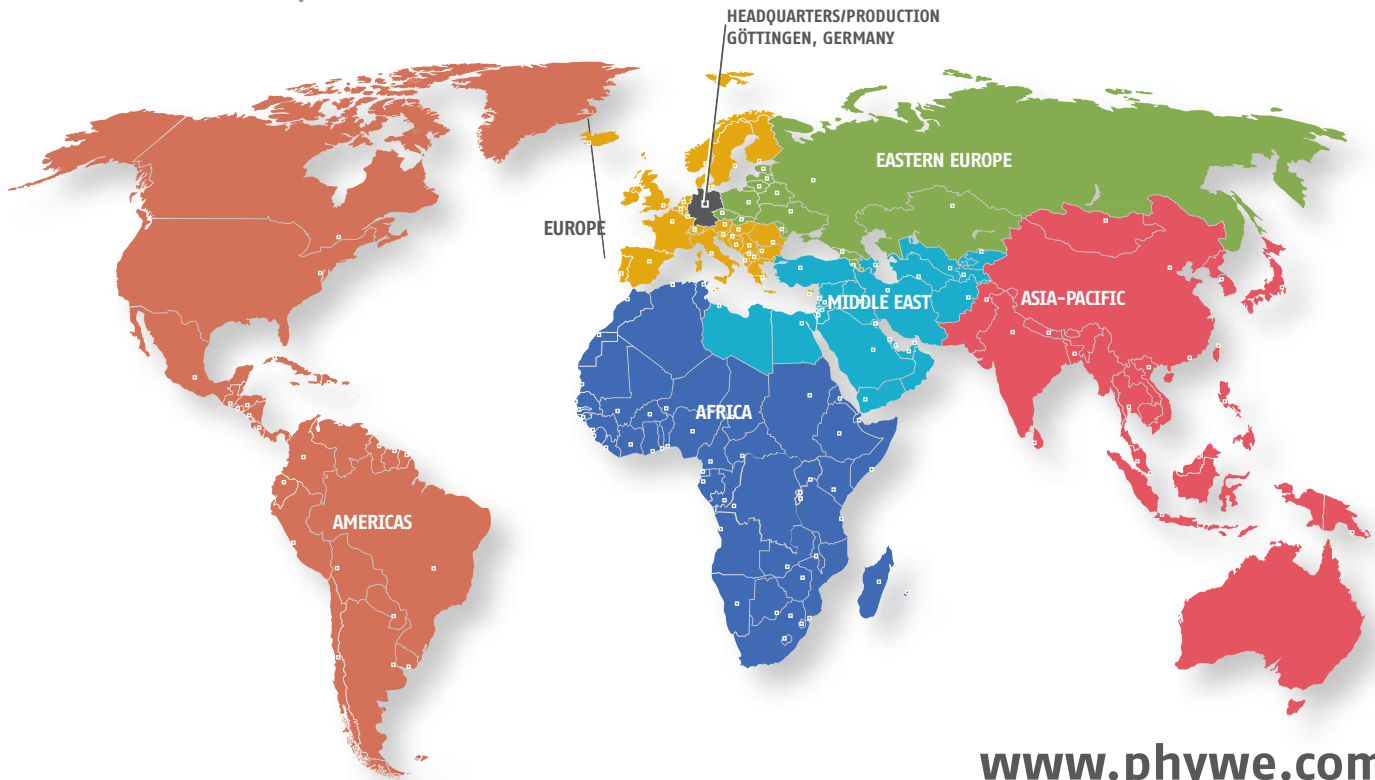
Low Voltage Directive 2006/95/EC

Compliance with the following product standards:
 DIN EN 60950-1; VDE 0805-1:2011-01:2011-01

PHYWE is certified in accordance with DIN EN ISO 9001:2008



Global network – Your partner is never far away!



www.phywe.com

Our worldwide presence enables us to offer you customised local solutions. More than 145,000 customers in over 95 countries appreciate our experience and reliability, our high technical standards, and the ease and clarity with which our innovative products can be operated.

Are you looking for a partner near your location?

Please do not hesitate to call us. We would be pleased to assign you a personal contact.

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