MAG 4Health

FYNA Research® OPM-MEG system

Product sheet

Official Distributor

BRAINBOX

INTEGRATING SOLUTIONS FOR NEUROSCIENCE

The **FYNA Research®** system is a magnetoencephalography (MEG) device that utilises Helium-based Optically Pumped Magnetometers (OPMs). The MAG4Health OPM-MEG is a brain imaging system that can be upgraded to accommodate up to 96 sensors on a single helmet, with the possibility of expanding further in a hyperscanning setup.

Unlike earlier rubidium-based OPMs, this new generation of Helium OPMs produces no noticeable heat during operation, enabling extended recording sessions and making the system suitable for use with newborns and children.

The Helium-based sensors offer a wide bandwidth (DC–2000 Hz), which makes them extremely versatile and applicable across multiple domains, including magnetospinography (MSG), magnetomyography (MMG), and magnetoneurography (MNG).

Tri-Axial Vector Sensors

Utilising Helium-based Optically Pumped Magnetometers (OPMs), these sensors are designed for precision and versatility.

- Dimensions: 21 x 21 x 54 $mm^{2.}$
- Weight (excluding cable): 45 grams.
- Sensitivity: 25 fT/√Hz on the X and Y axes; 200 fT/√Hz on the Z axis.
- Bandwidth: DC - 2000 Hz (mean).
- Operation: Each axis functions in closed-loop mode, continuously compensating for the measured magnetic field.
- Dynamic Range: ±200 nT per axis.
- The closed-loop design ensures:
  - A linear response within the defined dynamic range (±200 nT).
  - Cancellation of cross-axis effects.
- Adjacent sensor cross-talk is inherently below 8%. A patented automatic correction algorithm further reduces this to less than 0.5%.
- HPI for getting sensors positioned into the head reference frame, enabling co-registration with MRI data during post-processing.
- The helmet allows placement of up to two “reference” sensors using the supplied accessory.
- A 5-metre cable connects each sensor to the control unit.
- An integrated, automated sensor localisation system.

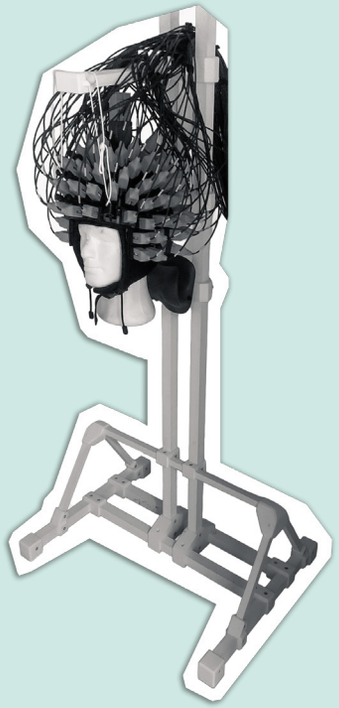
The **FYNA Research®** system includes a self-localisation function for aligning sensors within the patient’s head coordinate frame. This is achieved through a proprietary algorithm that alternately configures selected sensors as three-axis emitters and others as three-axis receivers. Users can freely reposition the sensors on the helmet to suit specific requirements.

Control System Cabinet

- Dimensions: 55 x 60 x 160 cm (Length x Width x Height).
- Weight: 80 kg (configured for 48 sensors).
- Modular Design: The control system supports up to 6 blocks of 16 sensors each within a single chassis.
- Power Supply: The FYNA Research® system operates on standard mains electricity (110V–220V, 50–60Hz). It is compatible with the European F-type plug and the United States B-type plug. For compatibility with other socket types, please contact us directly.

Conformable Helmet

The headset holder is designed to support the majority of the helmet's weight and is compatible with most standard chairs.



- Constructed from silicone and textile materials.
- The sensor array conforms to the patient's head, maintaining less than 2 mm offset from the scalp. Each sensor remains in contact with its designated area even as the head moves.
- Includes 96 slots for sensor placement.
- Adult helmet: Suitable for head sizes between 54 cm and 63 cm (96 sensors).
- Child helmet: Suitable for head sizes between 49 cm and 54 cm (89 sensors).
- Weight excluding sensors: 420 g (adult), 400 g (child).

Integration With Other Systems

Equipped with digital trigger channels to ensure synchronisation with additional neurophysiological systems:

- 16 trigger input lines, supporting up to 2^{16} distinct trigger codes.
- Up to 24 trigger output lines (TTL 0–5 V via DB25 connector).
- 1 video input and 2 video outputs (Display port).
- Stereo audio input and output via 3.5 mm jacks.

Further integration includes:

- 8 bipolar (or 16 unipolar) electrical input channels for recording EEG, EMG, ECG, and EOG signals.

User Interface & Acquisition Software

The FYNA Research® system features embedded, proprietary control and data acquisition software, offering:

- An intuitive graphical user interface.
- Automatic system start-up with real-time sensor status display.
- Simple adjustment of acquisition and visualisation parameters.
- Customisable or pre-configured sensor layouts.
- 3D visualisation of sensor self-localisation.
- Real-time signal display, with sampling rates ranging from 100 Hz to 6000 Hz.
- Online filtering options including low-pass, high-pass, band-pass, and notch filters.
- Real-time trigger display with associated event codes.
- Data output: Standard .fiff file format, fully compatible with MNE-Python software.
- API support: A low-level C++ API allows real-time acquisition and external exchange of MEG signals.

Use & Storage Conditions

- Operating environment: Indoor medical settings, at altitudes below 2000 metres
- Operating temperature range: 15°C to 30°C
- Storage and transport conditions (non-condensing): 0°C to 40°C
- Humidity range: 0–70% relative humidity
- Estimated device lifespan: 10 years

The FYNA Research® system is for Research use only.

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Watch the product demonstration:

MAG 4He alth

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