



Technical Information

3T MAGNETOM Cima.X *Siemens Healthineers*

CIBM MRI HUG-UNIGE

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Description

The MRI platform at CIBM MRI HUG-UNIGE supports both advanced clinical imaging and cutting-edge research. It is equipped with a **3T MAGNETOM Cima.X (Siemens Healthineers)**, installed in 2025, featuring the latest high-performance gradient system (Gemini 200/200) and parallel transmit capability (TimTX TrueShape). The system integrates **BioMatrix technology**, enabling patient-adaptive imaging through respiratory, cardiac, and motion sensors. This improves acquisition robustness, standardization, and reproducibility across heterogeneous populations. The configuration is optimized for **neuroimaging**, while supporting **multimodal clinical and research applications** in brain, spine, musculoskeletal, and cardiovascular imaging. Advanced acceleration techniques—including **Compressed Sensing** and **Simultaneous Multi-Slice (SMS)**—enable high-resolution imaging with reduced acquisition times, supporting demanding research protocols.

Core System and Hardware

- MAGNETOM Cima.X 3T system
- Tim [228x128] architecture
- Parallel transmit (TimTX TrueShape)
- High-performance gradients (Gemini 200/200)

Coils Available

- Head coils: 20 / 32 / 64 channels
- Spine coil: 32 channels
- Body coils: 18 / 30 channels
- Dedicated coils: knee, wrist, ankle, shoulder
- LMT head-array coil 16-ch for Nomag incubator (neonatology)

BioMatrix Technology

- Respiratory sensors
- Cardiac (Beat Sensor)
- Motion sensor (SAMER)
- Automated slice positioning and acquisition optimization

Multi-Nuclear (X-nuclei) Imaging Capability

The system is equipped with a multi-nuclear (X-nuclei) hardware and software module, enabling imaging and spectroscopy beyond proton (¹H).

Supported nuclei: ³He, ⁷Li, ¹³C, ¹⁷O, ¹⁹F, ²³Na, ³¹P, ¹²⁹Xe

Key features:

- **Tim MNO interface** for connection of multinuclear RF coils
- RF pulse generation and signal reception across all supported nuclei
- Dual-frequency capability within a single sequence (**¹H + X-nucleus**)
- Automatic ¹H coil selection for shimming
- User control of frequency tuning and transmit/receive parameters

Patient Handling and Experimental Integration

- **Motorized detachable table (eDrive)**
- Rear table control for flexible setup
- Facilitates patient installation or complex experimental setups
- Reconstruction, computing & software

Reconstruction and AI:

- **High-end computing infrastructure** for advanced reconstruction and AI workflows
- Deep Resolve Pro (deep learning reconstruction). AI-based denoising and super-resolution

Software Environment

- **syngo MR XA61 platform**
- syngo Expert-i
- MR General Engine
- Tim Whole Body Suite
- Tim Planning Suite
- Inline Composing & FastView

Advanced Imaging Capabilities

Neuro Imaging

- fMRI / DTI package
- **Advanced Diffusion + BLADE diffusion (motion-robust)**
- **MR Fingerprinting (brain)**
- **Perfusion imaging:**
 - DSC
 - ASL 2D / 3D
 - PCASL
- **SWI (susceptibility imaging)**
- **Spectroscopy (SVS + spectral editing)**
- MapIt quantitative mapping

Cardiovascular Imaging

- Phase imaging
- Flow quantification
- QISS (non-contrast angiography)
- MyoMaps (quantitative cardiac mapping)
- Advanced cardiac imaging (including PSIR)
- Real-time imaging

Prototype sequences

Under collaboration agreements, use of specialized or prototype WIPs (Siemens) or C2P (Customer-to-Partner) sequences can be used for research.

Acceleration and Advanced Acquisition

- Turbo Suite (SMS TSE + EPI)
- Compressed Sensing (CS GRASP-VIBE, CS Cardiac Cine)

Research Infrastructure and software

- The MRI system is integrated within a broader research environment including:
- Physiological monitoring (Biopac system)
 - HR, PPG, respiration, CO₂, O₂
- Possibility to install MR-compatible EEG (BrainAmp MR)
- Audio system: slim headphones, microphone (MR confon)
- LCD screen: BOLD screen 32 (Cambridge systems)
- Response devices (current design)
- VR environment
- Task presentation: E-Prime, Matlab, Psychopy, Psychtoolbox.
- Real-time fMRI imaging processing capability
- Online export of raw k-space data to a remote research workstation
- MRC camera