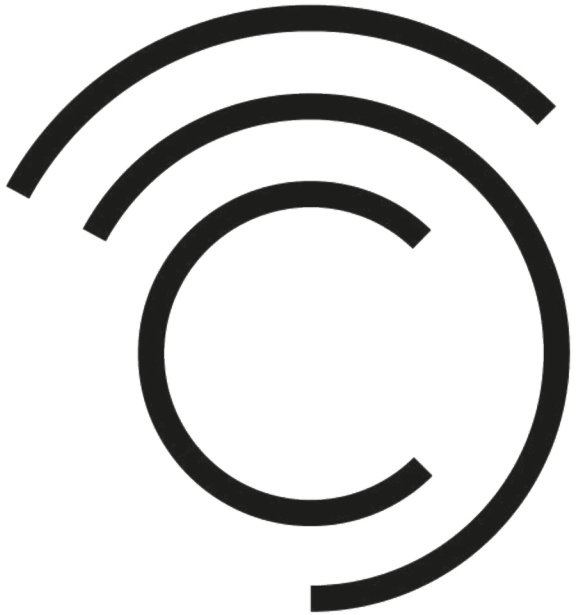


Tesla Dynamic Coils

META BRAIN

A Quintuple-tuned Whole-Brain RF coil for Metabolic study at 7T

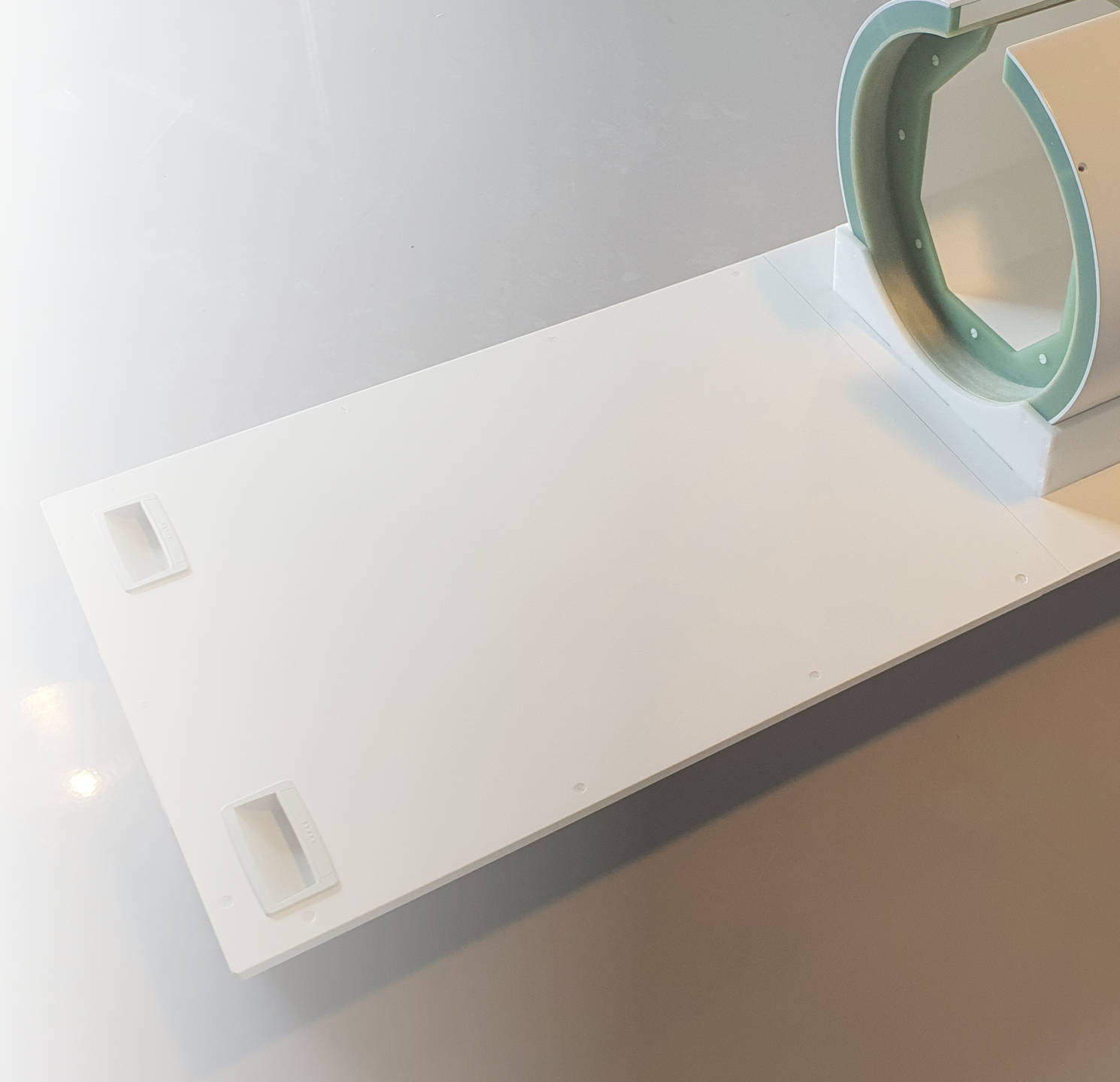
Tesla Dynamic Coils

Intended use

The MetaBrain headcoil is a Research coil for 7 Tesla imaging of cell metabolism to gain a better understanding of diseases and treatment possibilities.

- **Application examples*:**
  - Neurodegenerative diseases
  - Outcome of Cancer treatment
  - Timely detection of (un)succesful treatment

*Exclusively for clinical investigation



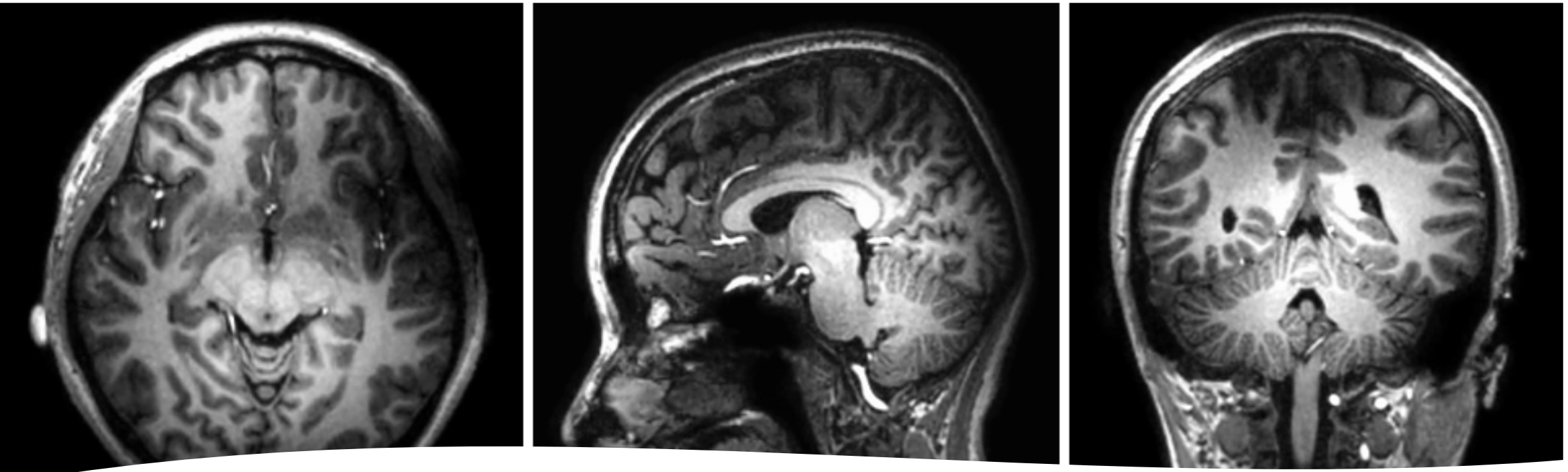
Tesla Dynamic Coils

Technology

- **Surface coils (receive signal) resonating at three frequencies:**
  - ^{31}P
  - ^{23}Na
  - ^{13}C
- **Antennas for transmitting and receiving:**
  - ^{1}H
  - ^{19}F

Tesla Dynamic Coils

Results: ^{1}H



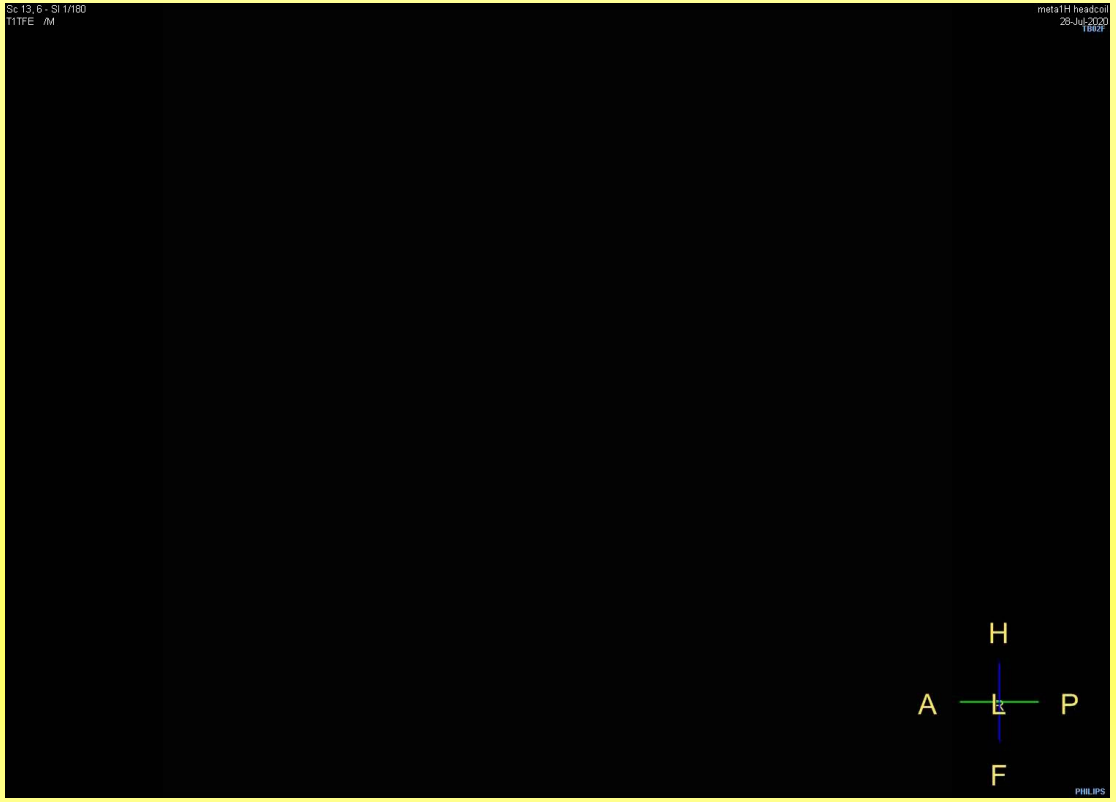
- ^{1}H in vivo, raw data
  - 3D TFE, 6.9min, $1mm^3$
  - 18uT at the center
  - 922 watt forward peak power per channel
  - no post processing

Tesla Dynamic Coils

Results – ^{1}H

Press play
(below image)

for video

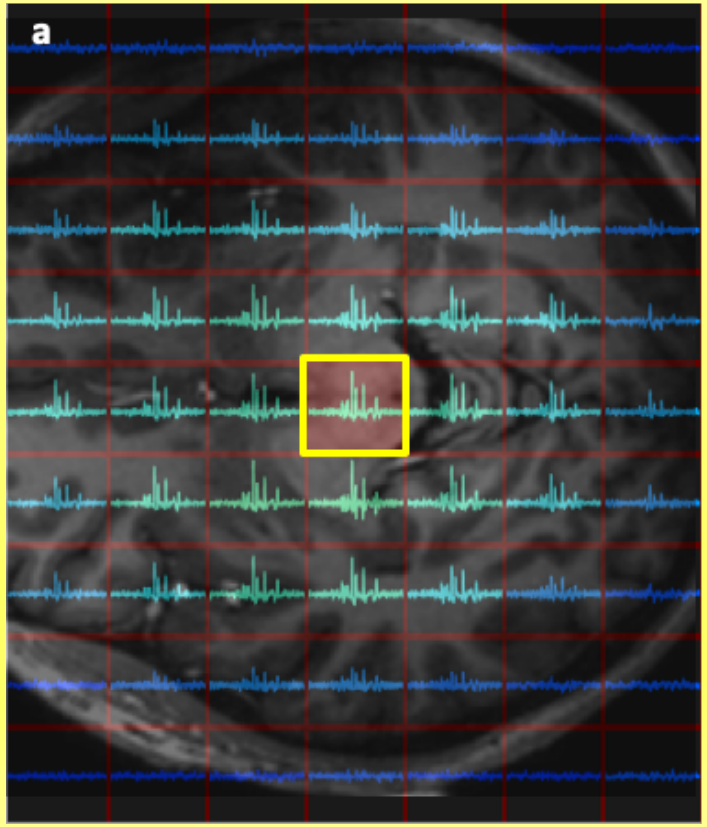


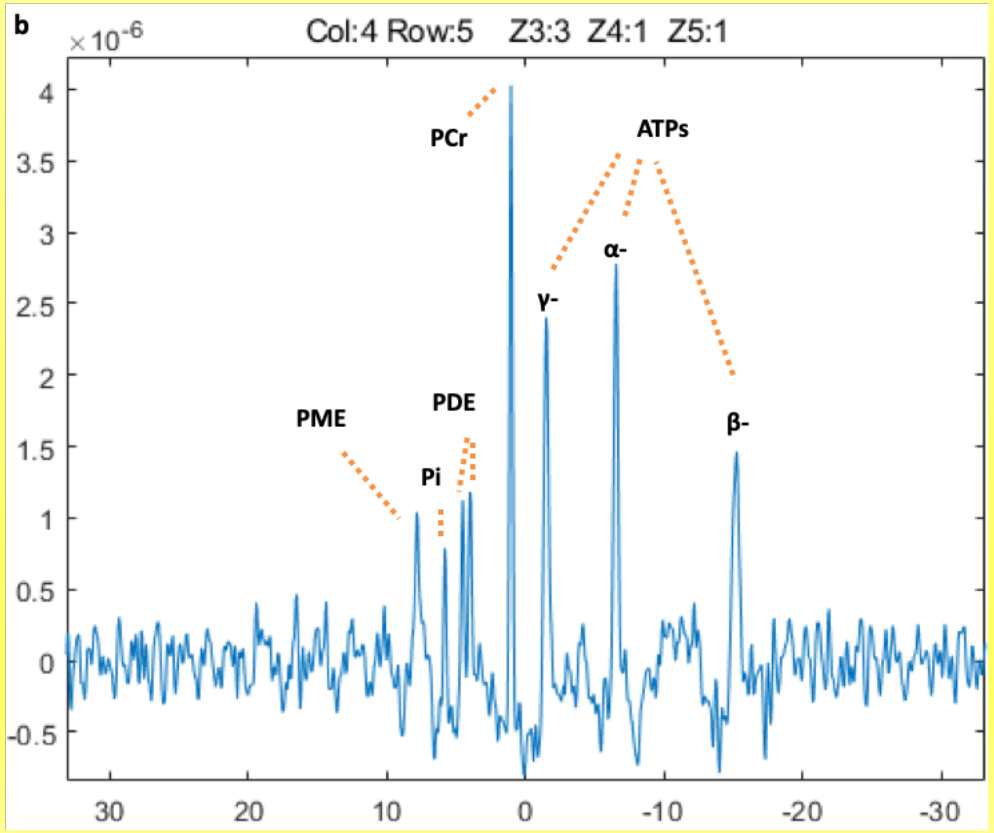
Tesla Dynamic Coils

Results – ^{31}P

^{31}P in vivo scan

- 3D CSI FID, 10min
- 2cm^3 voxel

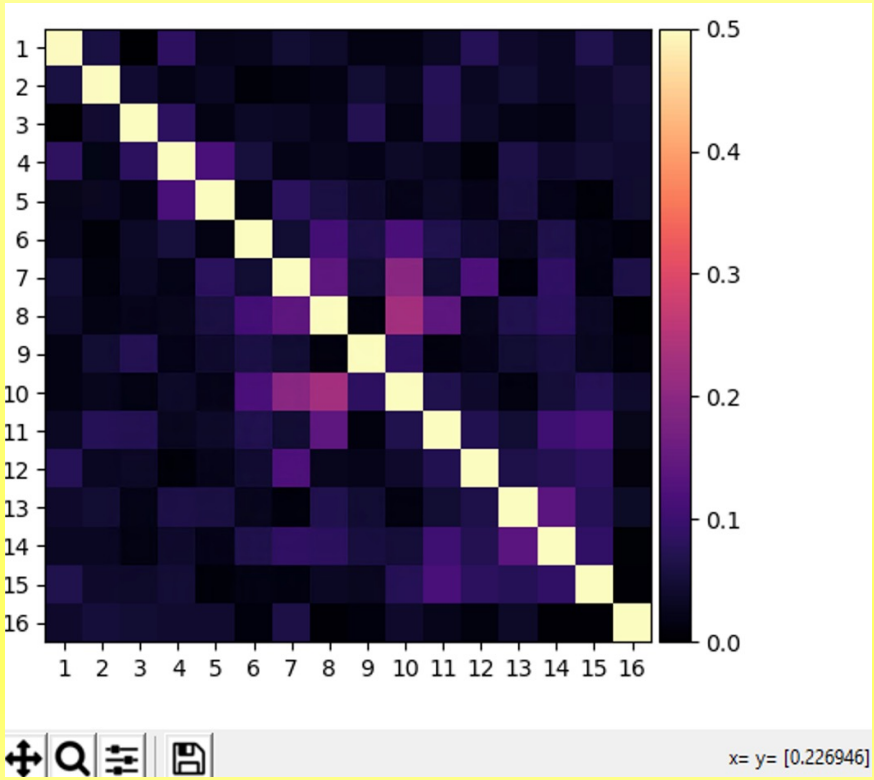




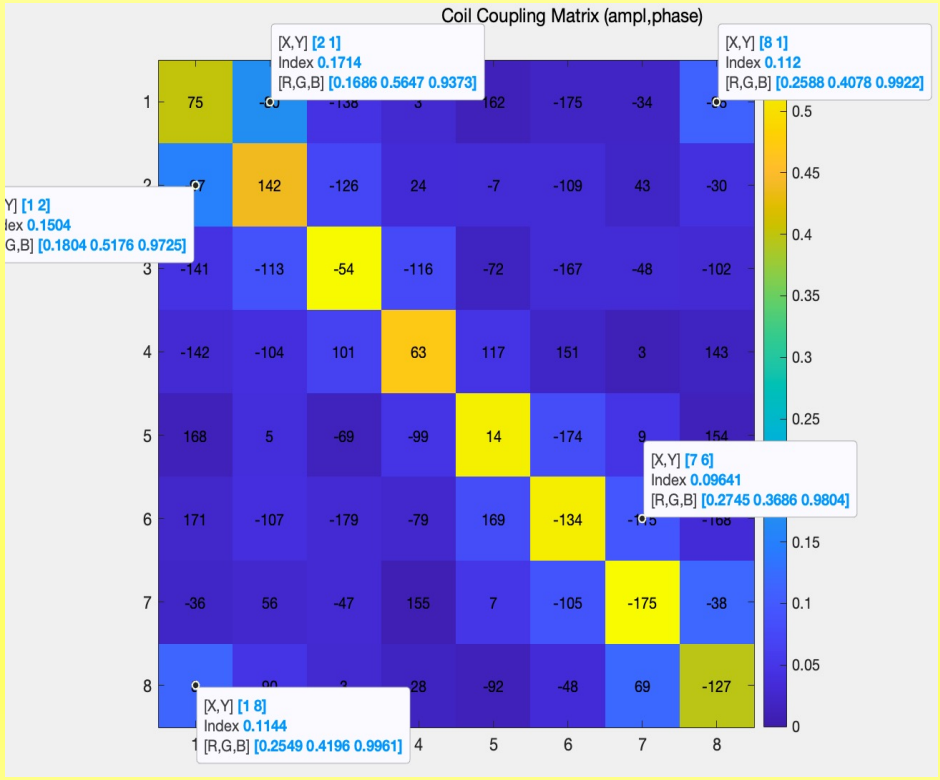
Tesla Dynamic Coils

Results – ^{31}P

Noise Correlation matrix ^{31}P (max 22%)



Coil Coupling matrix
17% → -7.7dB

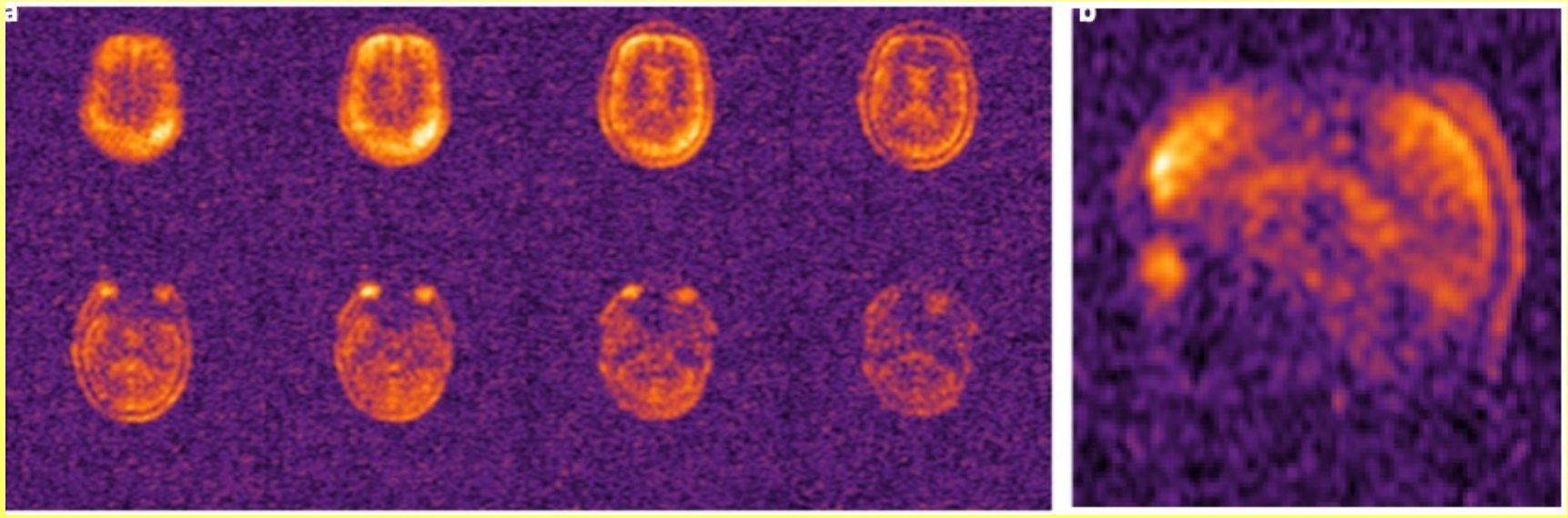


Tesla Dynamic Coils

Results – ^{23}Na

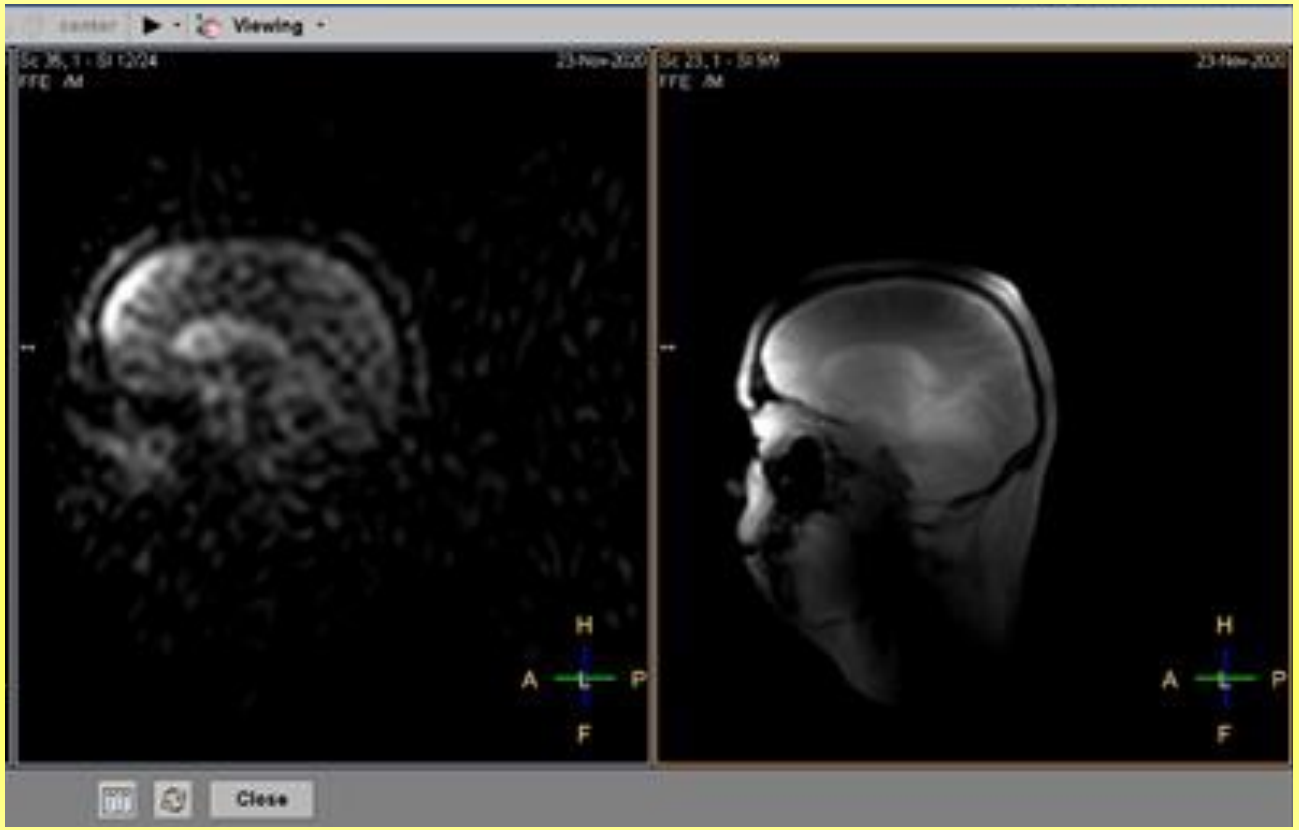
^{23}Na in vivo scan

- 3D FFE, 10min
- TE = 1,35ms
- 26mm^2 in plane



Tesla Dynamic Coils

Results – ^{23}Na

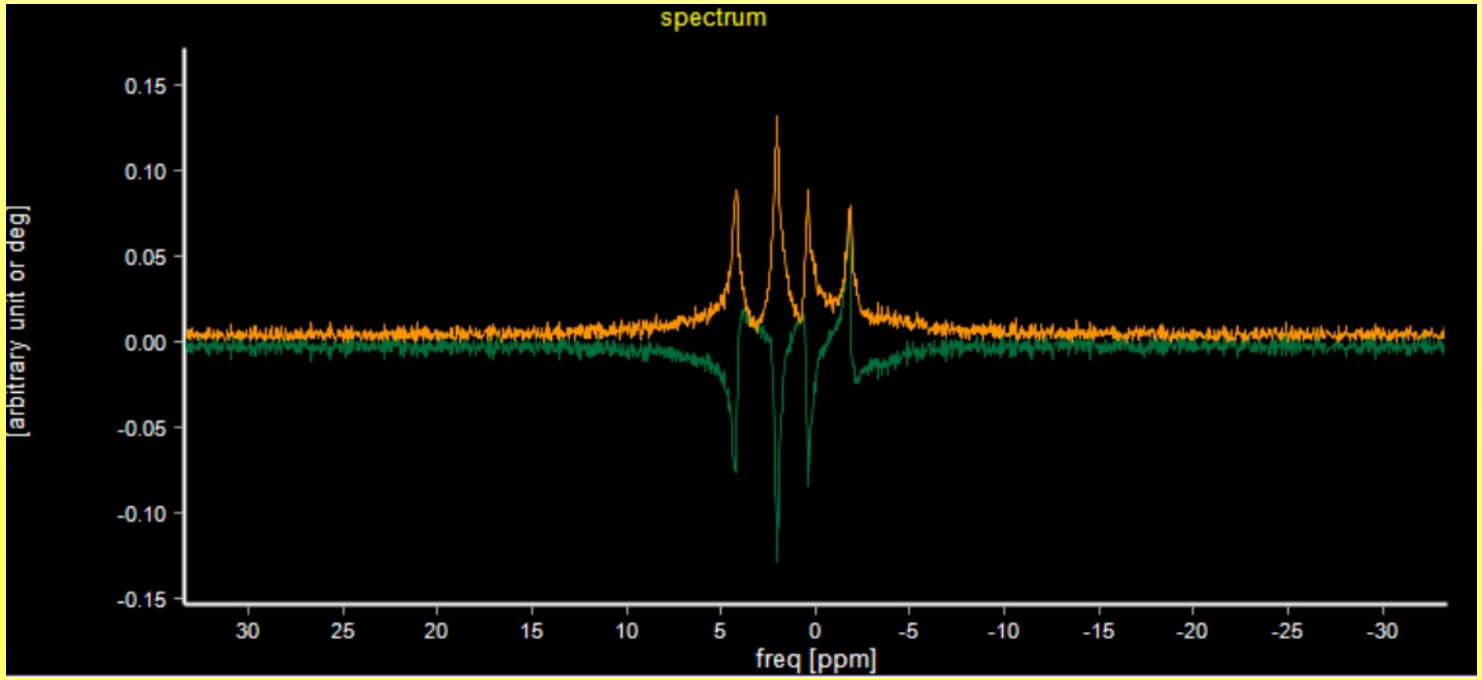


Tesla Dynamic Coils

Results – ^{13}C

^{13}C phantom scan

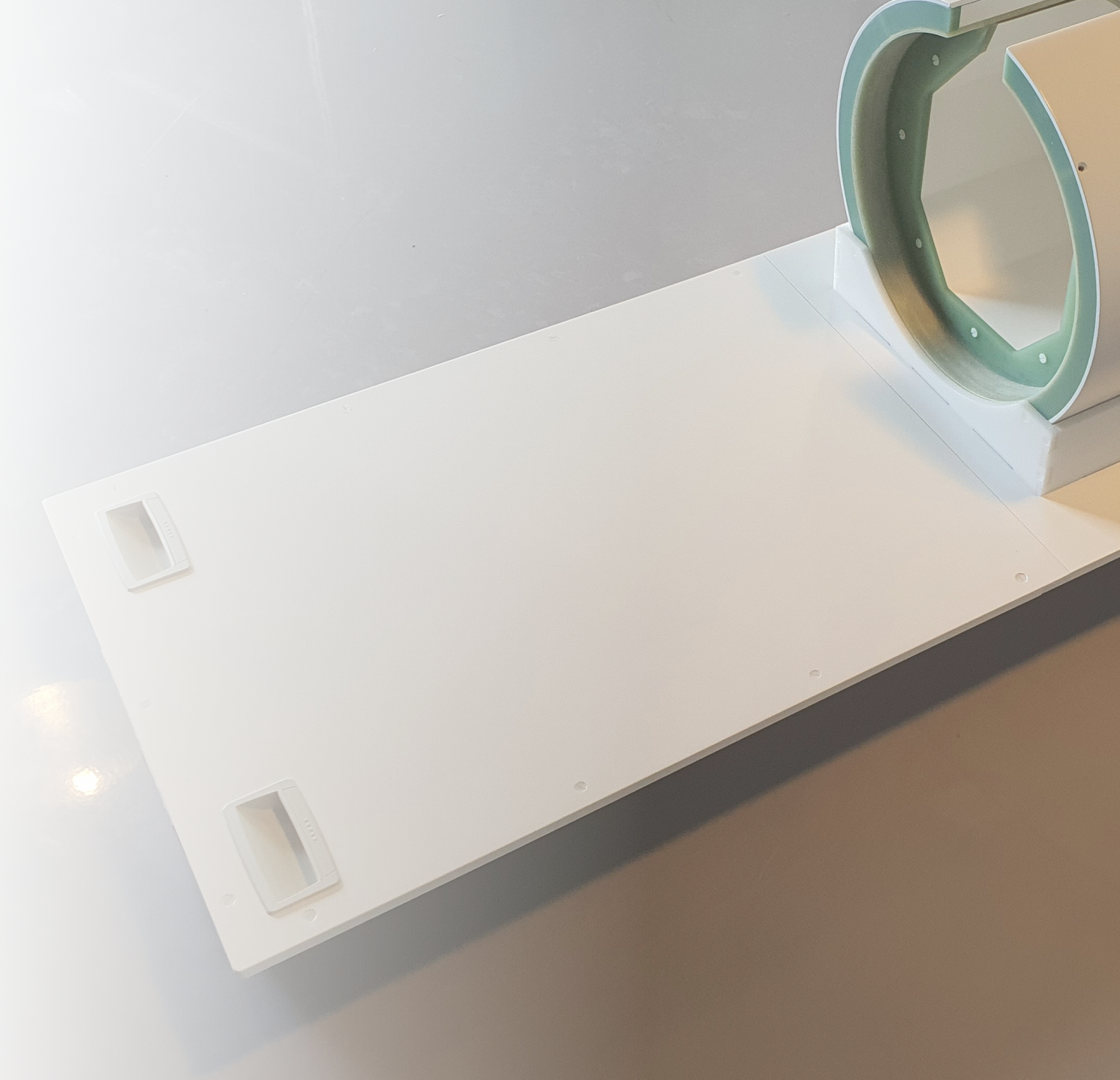
- Preliminary results
- ^{13}C labelled glucose phantom
- Single voxel FID



Tesla Dynamic Coils

META Brain advantages

- Scanning of ^{1}H, ^{19}F, ^{31}P, ^{23}Na, ^{13}C *in one session*
- High Signal-to-Noise ratio for Multi nuclei
- Highly efficiency for Proton
- No coil swap necessary
- Minimal coil sensitivity compromise



Tesla Dynamic Coils

For more information, please contact us at info@tesladc.nl or (+31) 418 74 00 60

Support research paper:

ISMRM 2021: A Quintuple-Tuned RF Coil for Whole Brain Multi-Nuclei Magnetic Resonance Imaging and Spectroscopy at 7T