Protocol DWS – STE-LASER and DW-SPECIAL, surface coil

Bruker 14.1T - Lausanne

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# SCAN INFO

**Date:**

**Operator:**

**Vet:**

**Study:**

**Scan number:**

**Rat ID:**

**Weight:**

**Authorisation:**

**Temperature:**

**Respiration:**

# ADJUSTMENTS + IMAGES FOR VOXEL POSITION

* TAIL\_PRONE, 1H-Qsurf\_Rat, MRI\_TxSuc

Time:

* **Localizer for position:** 
  + *Adj*: wobble (setup, stop)
  + *Inst*: basic frequency/MR scan
  + Fix it

**Adj\_locMSandT2rare\_JM\_26032021**

Time when launched localizer MS:

* **Localizer\_multi\_slice\_10\_short for voxel position:**
  + *Adj*: study shim, ref power (Gauss 6 kHz, 2mm slice below the black spot)
  + *Seq*:
    - *Cerebellum*: 1av, **10** slices per dir, Image size:256^2, FOV:25^2, position slices, current shim
    - *Full brain*: 1av, **15** slices per dir, Image size:256^2, FOV:25^2, position slices, current shim
  + *Inst*: auto acq

**Ref power:**

Target ref power ~200g-rat: **0.02W**

Target ref power ~300g-rat: **0.03W**

Time when launched T2 turbo rare:

* **T2\_TurboRARE\_6\_54K for voxel position:** 
  + *Adj*: B0 map (3av, Image size:96^3, FOV:34^3, recons 12%, current shim)
  + *Seq*:
    - *Cerebellum*: 2av, DS=4, rare factor 6, encoding start: -1 – in resolution/encoding, 256^2/**16^2, 10 slices**, **slice thickness 0.8mm,** gap=0.2mm, position slices, mapshim (big ovoid)
    - *Full brain***:** 2av, DS=4, rare factor 6, encoding start: -1 – in resolution/encoding, 256^2/**20^2**, **15 slices**, **slice thickness 1mm**, gap=0.2, position slices, mapshim (big ovoid)
  + *Inst*: auto acq

**B0map number:**

# STEAM HIGH RESOLUTION FOR ABS. MET. QUANTIF + SHIM

**STEAM\_highres\_phcycl\_JM\_26032021 (with good spoiling: 15/25/35% OVS and 1/25/30/20 2nd TE/2, and updated to save the RF pulse files even when calculated)**

Time when launched STEAM water:

* **STEAM\_highres\_phcycl\_JM\_260321\_water for shimming:**
  + *Seq*:
    - *Cerebellum*: position voxel **(6.5/4/3.6)**, 2 averages, 1 rep, offset 0, no WS, 2 DS, TE=3, TM=10, TR=4, mapshim on voxel (cuboid, no margin, iterative corrections), OVS (12mm, gap=0,3mm, 3ms-spoilers with 15%), no trigger
    - *Full brain:* position voxel **(7/5/5),** 2 averages, 1 rep, offset 0, no WS, 2 DS, TE=3, TM=10, TR=4, mapshim on voxel (cuboid, no margin, iterative corrections), OVS (12mm, gap=0,3mm, 3ms-spoilers with 15%), no trigger
  + *Inst*: scan shim, local frequency, local shim, local frequency, Rx array phases, RG, MR Scan

**Voxel size:**

**Voxel position:**

**LW:**

Target shim, cereb, vox size 6.5/4/3.6**: 28Hz**

Target shim, full brain, vox size 7/5/5**: 20Hz**

**Save shims $**

**Copy the previous instruction later to redo the shim, eventually redo a b0 map to improve the calculation of mapshim**

* **STEAM\_highres\_phcycl\_JM\_260321\_water:**
  + *Seq*: copy previous with 1 av, 2 rep, current shim, no trigger
  + *Inst*: auto

Time when launched STEAM metabolites:

* **STEAM\_highres\_phcycl\_JM\_260321\_WS:**
  + Test the WS before in setup mode: play with delay, attenuations, flip angle etc
  + *Seq*:
    - *Cerebellum*: same with **192** rep, WS (84°/150° + calc + last delay 22ms), current shim, ref scans 2, no trigger
    - *Full brain:* same with **96** rep, WS (84°/150° + calc + last delay 22ms), current shim, ref scans 2, no trigger
  + *Inst*: auto acq

**WS pulses power, flip angles:**

**90° power:**

**STELASER FOR DIFFUSION**

**Update the power of adiabatic to reach the plateau if weight > 300g**

**stelaser\_JM\_26032021 (with 60% spoilers)**

Time when launched STELASER water:

* **stelaser\_dIRWSTE\_14T\_JM\_04082020\_water**
  + *Seq*: copy voxel, no WS, no OVS, current shim, 2 av, 1 rep, 2 DS, no trigger
  + *Inst*: auto acq (redo local shim if necessary)

**LW:**

Time when launched STELASER metabolites:

* **stelaser\_dIRWSTE\_14T\_JM\_04082020\_WS**
  + *Seq*: 16 averages, 1 rep, no OVS, WS (84°/150° + calc + last delay 22ms), current shim, no trigger
  + *Inst*: auto acq

**90°/180°/extraWS power:**

**SHIM TABLE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Exp nb | LW | Operation | New LW |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**DIFFUSION SET - STELASER**

**stelaser\_diffusionset\_JM\_26032021**

Time:

Cerebellum:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Number** | **Experiment nb** | **Time** | **Loaded in topspin** | **QC** | **Bval** | **NR** | **TR (ms)** | **Time (min)** | **Nb ref scans** |
| 1 |  |  |  |  | 50 | 320 | 3000 | 16 | 2 |
| 2 |  |  |  |  | 100 | 320 | 3000 | 16 | 16 |
| 3 |  |  |  |  | 500 | 320 | 3000 | 16 | 16 |
| 4 |  |  |  |  | 1000 | 320 | 3000 | 16 | 64 |
| 5 |  |  |  |  | 3000 | 320 | 3000 | 16 | 64 |
| 6 |  |  |  |  | 5000 | 320 | 3000 | 16 | 64 |
| 7 |  |  |  |  | 10000 | 512 | 3000 | 25 | 128 |
| 8 |  |  |  |  | 15000 | 640 | 3000 | 32 | 128 |
| Total time | | | | | | | | 2h33 | |

Full brain:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Number** | **Experiment nb** | **Time** | **Loaded in topspin** | **QC** | **Bval** | **NR** | **TR (ms)** | **Time (min)** | **Nb ref scans** |
| 1 |  |  |  |  | 50 | 160 | 3000 | 8 | 2 |
| 2 |  |  |  |  | 1000 | 160 | 3000 | 8 | 2 |
| 3 |  |  |  |  | 3000 | 160 | 3000 | 8 | 2 |
| 4 |  |  |  |  | 5000 | 160 | 3000 | 8 | 8 |
| 5 |  |  |  |  | 10000 | 320 | 3000 | 16 | 8 |
| Total time | | | | | | | | 48min | |

**MACROMOLECULES - STELASER**

**stelaser\_MM\_JM\_26032021**

Cerebellum: 64 averages, 10 rep, IR pulse (2ms, 10kHz, 11W), TI1=2200ms/TI2=800ms, no EDC, TR=4s, b=5000

Full brain: 64 averages, 7 rep, IR pulse (2ms, 10kHz, 11W), TI1=2200ms/TI2=800ms, no EDC, TR=4s, b=10000

Use MR scan only and read rawdatajob0

**DWSPECIAL**

Sequence used for DW-SPECIAL paper: specialjmDWspIRnoXtt

Protocol used for DW-SPECIAL paper: none

**Full brain:** TErfc=9.5ms, TR=3000, NR=160, spoilers dur = 1/3ms, spoiler strength=0/40/40,1/8/8, HS pulse, 2ms-10kHz-11W, P10jm 0.5ms-13540Hz,4.8W, hermite 330Hz, bp32 0.1ms-10kHz, 2DS, OVS (12mm, gap=0,3mm, 3ms-spoilers with 15%), TEste=8.9 ms, reference scan + ECC, navigator + drift correction

**MACROMOLECULES - DWSPECIAL**

Sequence used for DW-SPECIAL paper: specialjmDWspIRnoXtt

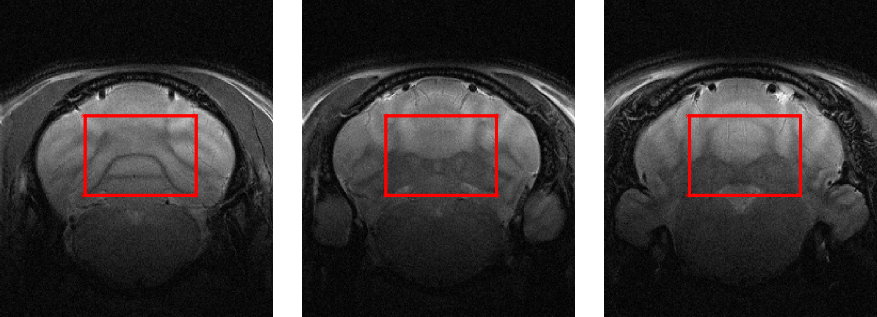
Protocol used for DW-SPECIAL paper: none

**Full brain:** 64 averages, 7 rep, IR pulse (2ms, 10kHz, 11W), TI1=2200ms/TI2=850ms, no EDC, TR=4s, b=10000

Use MR scan only and read rawdatajob0

NB: specialjmDWspIRnoXtt has an issue with the calculation of the diffusion time that shows up in the card, the corrected version of the sequence is spejmDWspIRnoXtt2 done on 14/11/2022 but was never used (should be double checked)

**Cerebellum voxel:**



**Full brain voxel:**

