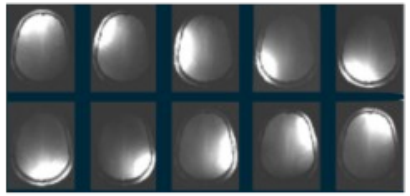
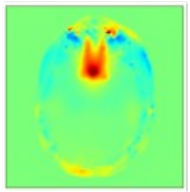
Physics Model

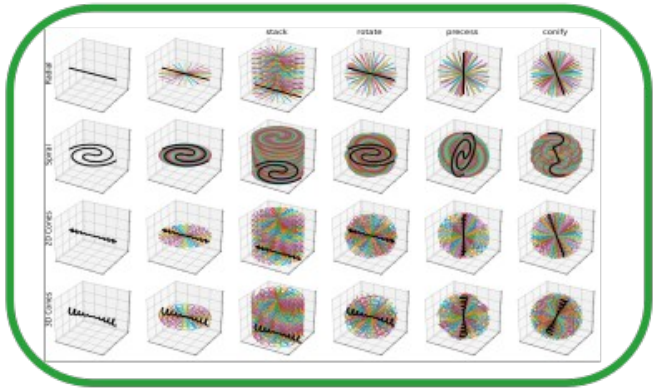


Coils sensitivities



Off Resonnance Correction

Kspace Trajectory



NUFFT libraries

finufft

pyNFFT

gpuNUFFT

pyNUFFT

BART

...

MRI-nufft

NumPy

CuPy

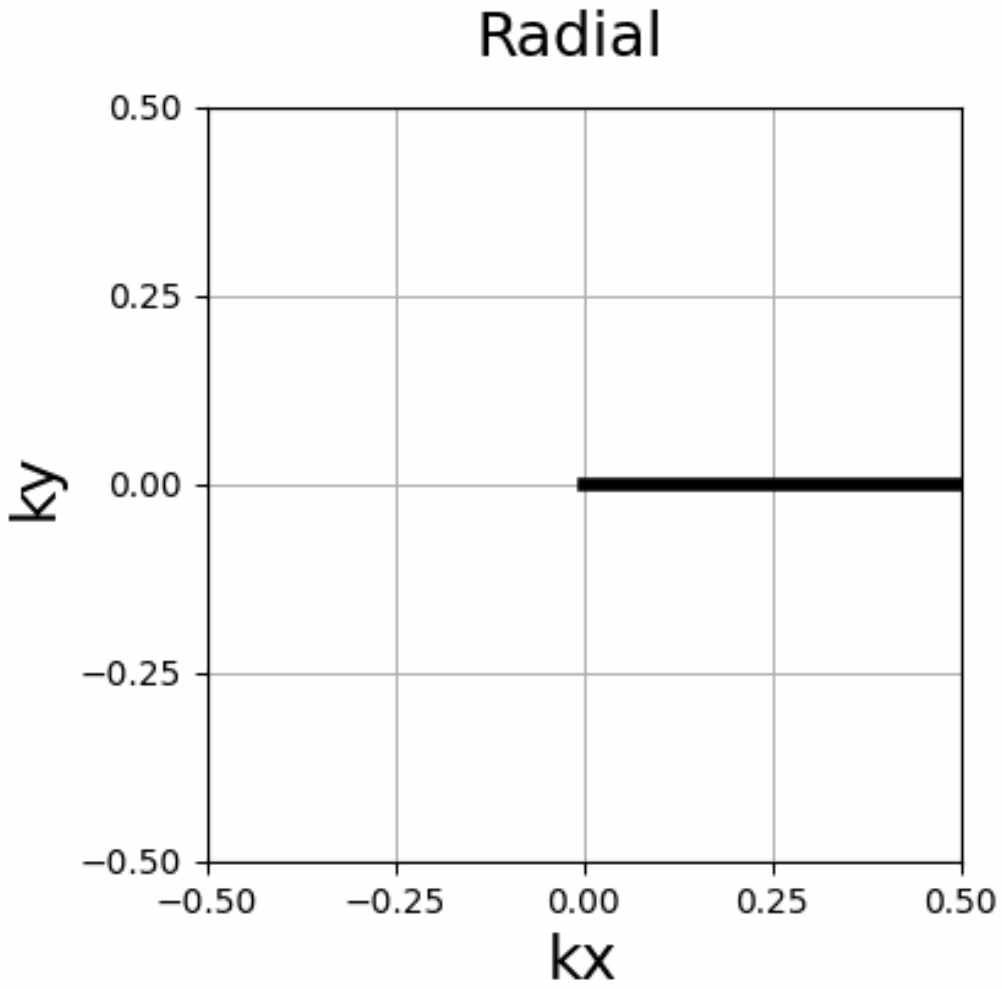
PyTorch

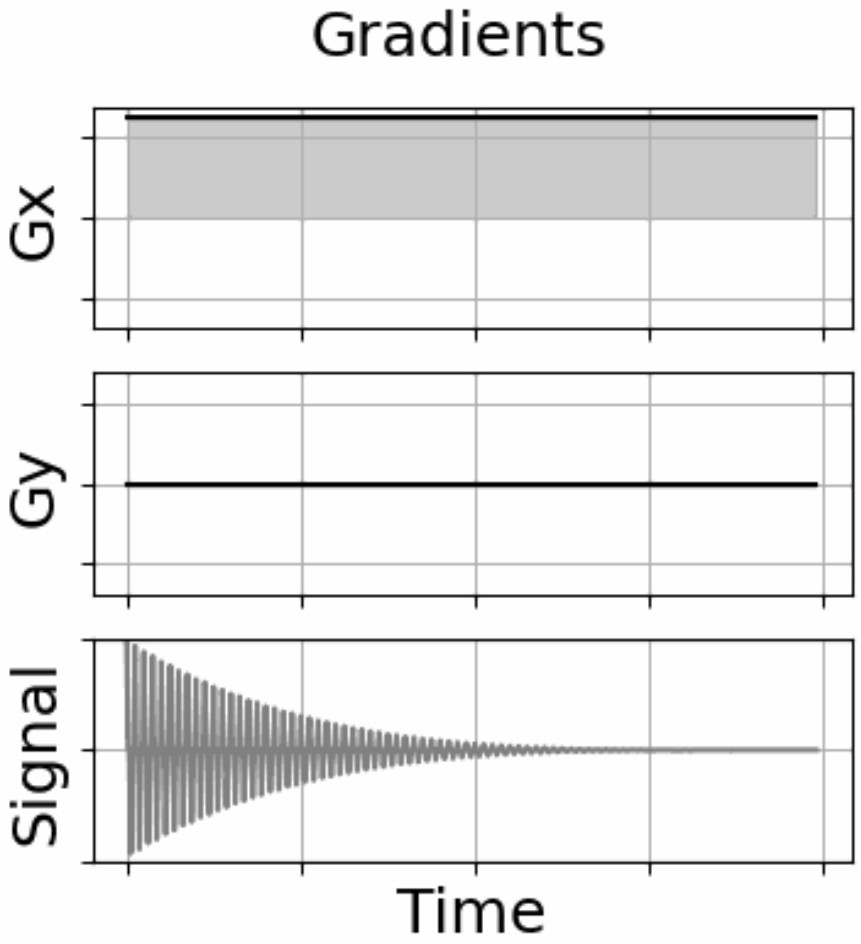
4675

Pierre-Antoine Comby
Guillaume Daval-Frérot
Alexandre Vignaud
Phlippe Ciuciu

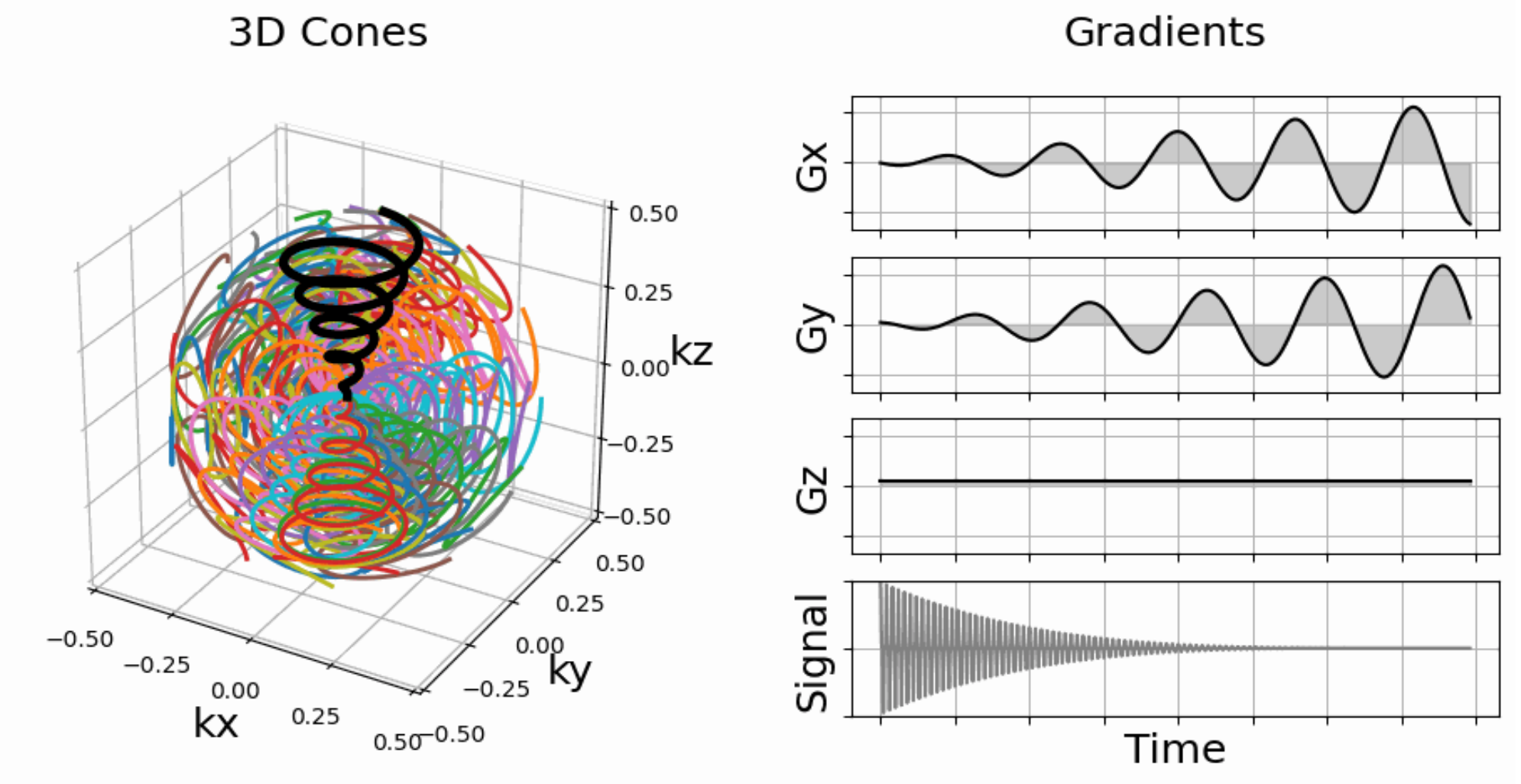
https://github.com/mind-inria/mri-nufft

K-Space Trajectory generation



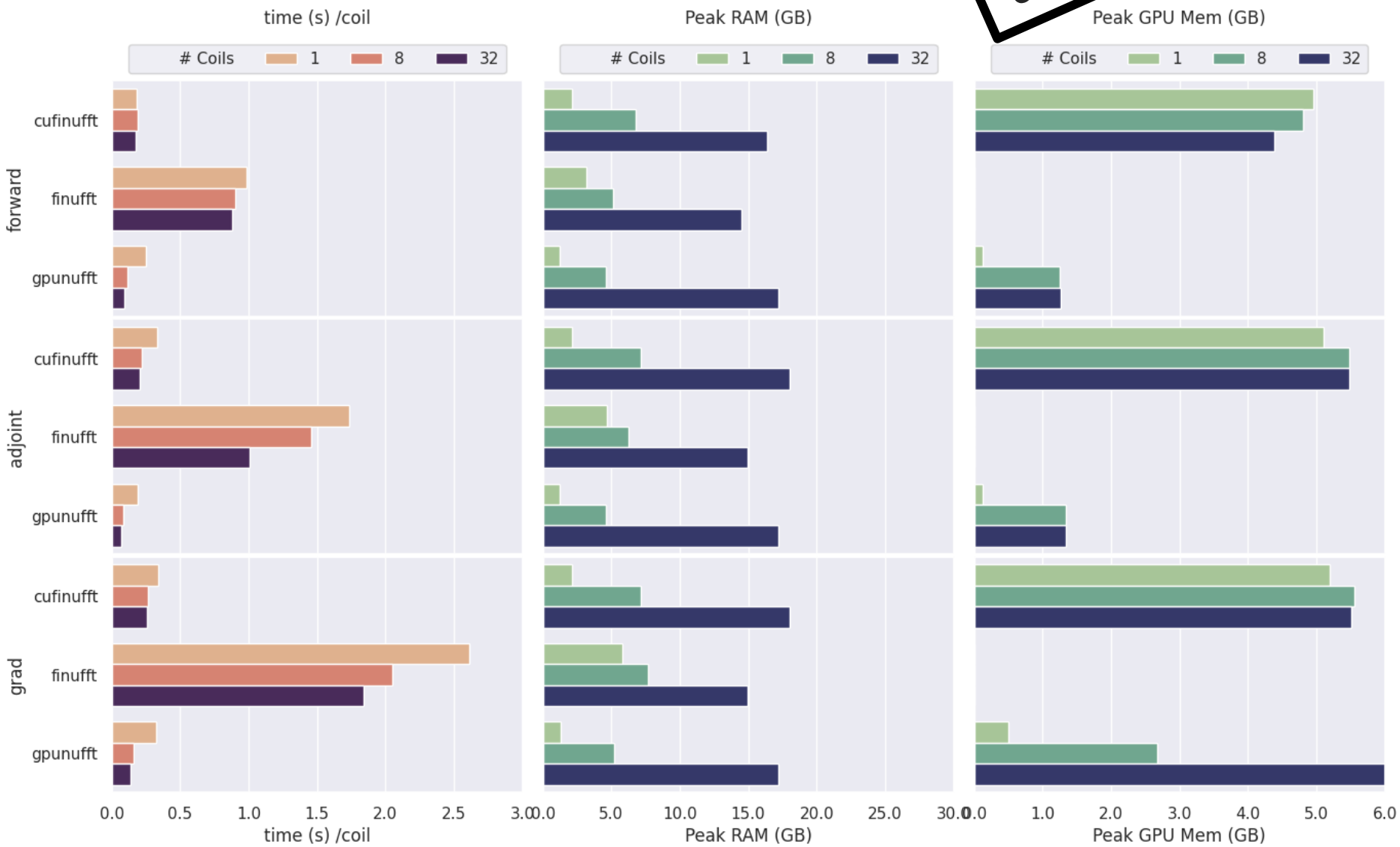


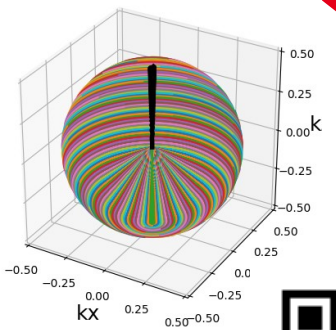
K-Space Trajectory generation



Benchmark of NUFFT Libraries

2024 UPDATED





Floret Trajectory

N_{shot}=3994

$N_{s/shot}$ = 10240

Shape 256x256x170

eps = 10^{-3}

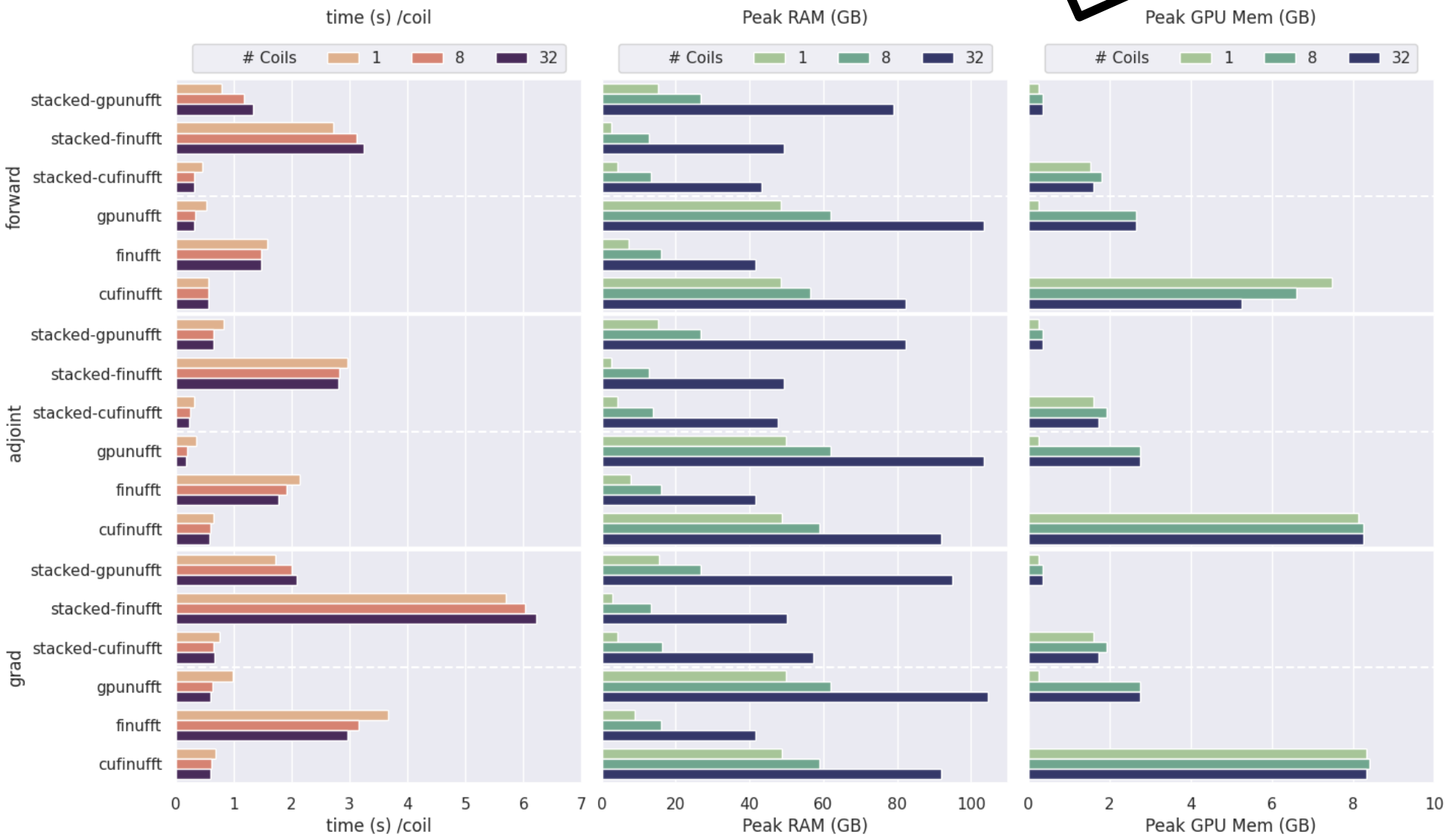
upsampfac = 2.0

GPU: RTX 5000

CPU: Intel Xeon Silver 4210R

Benchmark of NUFFT Libraries

2024 UPDATED



Stack of Spiral

N_{stacks}:208

N_{shots} : 133

$N_{s/shot}$: 10240

Shape: 256x256x170

eps = 10^{-3}

upsampfac = 2.0

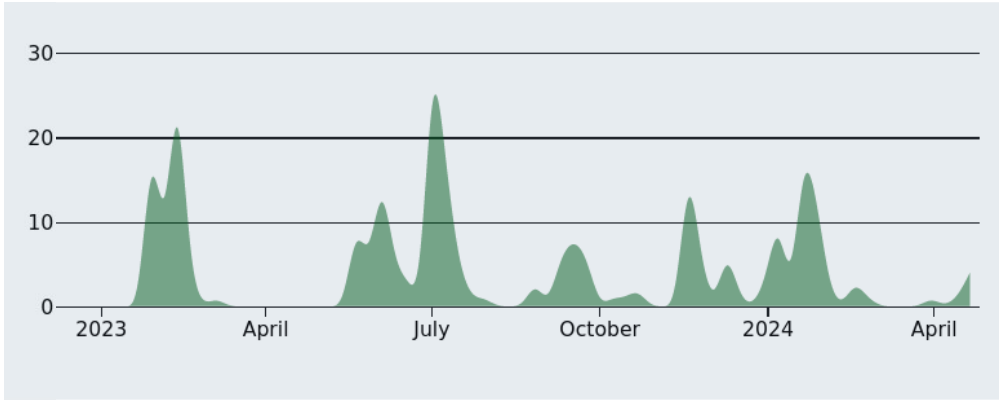
GPU: RTX 5000

CPU: Intel Xeon Silver 4210R

https://github.com/mind-inria/mri-nufft-benchmark

There is more !

- Expansion of Known Trajectories
- Gradients / Slew rate Constraints checks
- Visualization Tools
- Full Pytorch integration
  - Autodifferentiation, Batch support, etc...
- Density Compensation Estimation
- Sensitivity maps estimation
- IO module for import/export of data
- ... and more to come !



Contributions to MRI-nufft

Thank you for your attention

- Related work (built on top of MRI-NUFFT)
  - PySAP-MRI
  - PySAP-fMRI
  - SNAKE-fMRI (Abstract: **3408**)
  - Study of Fast fMRI effect (Abstract **3420**)
- Use it !
  - Code https://github.com/mind-inria/mri-nufft
  - Install `pip install mrinufft`
  - Documentation https://mind-inria.github.io/mri-nufft