Automated Winding Device For MRI Calibration And Testing

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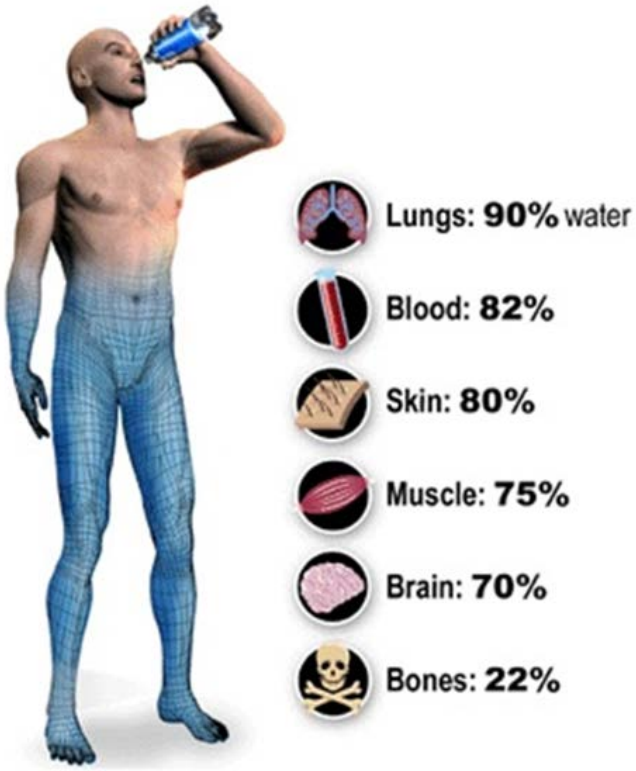
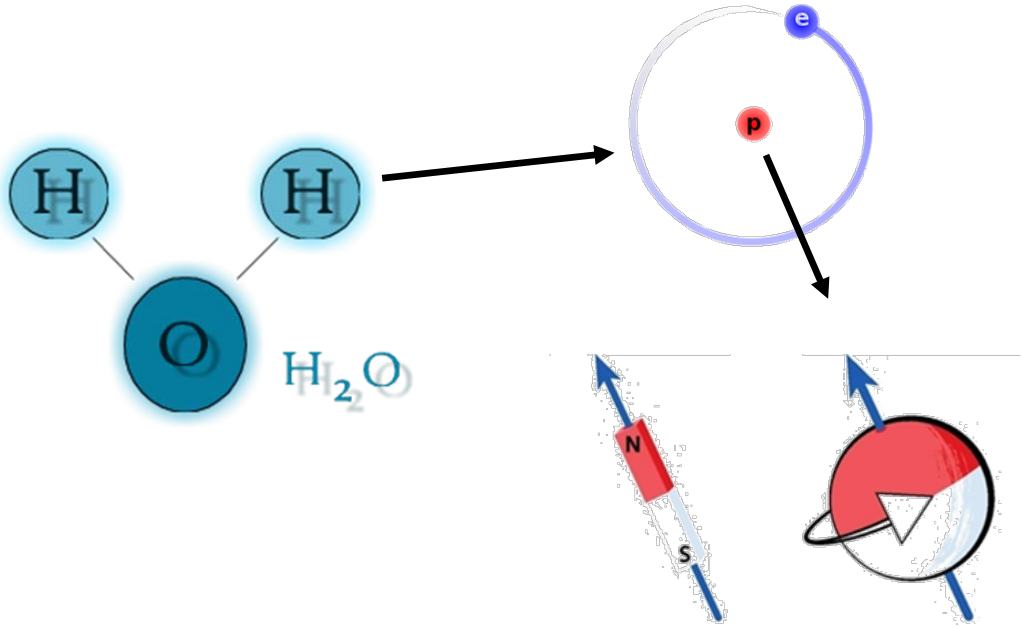
MRI Introduction

Our body consists approximately 60 – 70% Water

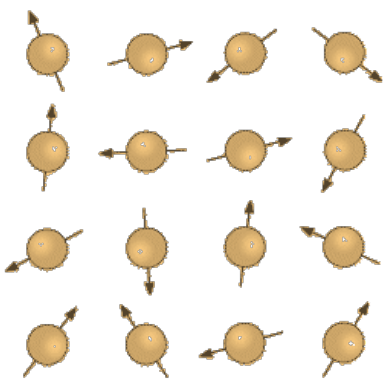


Water in itself includes Hydrogen which has highest sensitivity to magnetic resonance

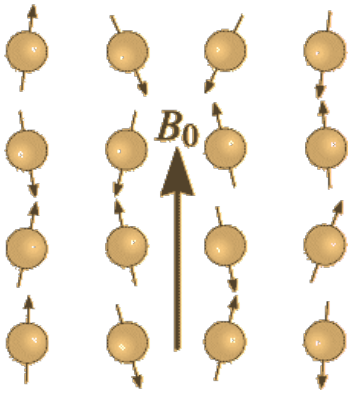


MRI Introduction

Protons alignment in the body

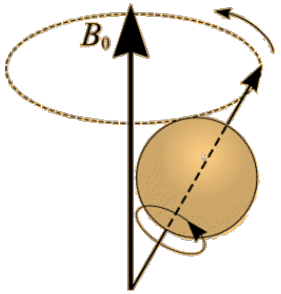


Without magnetic field

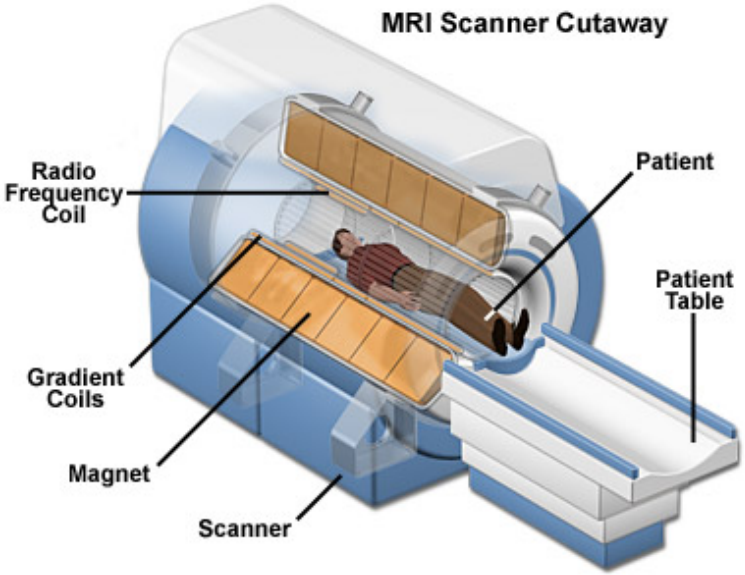


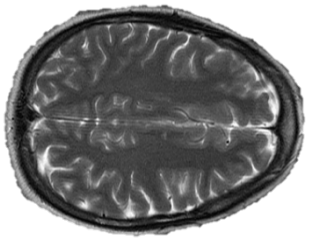
With magnetic field

RF Pulse



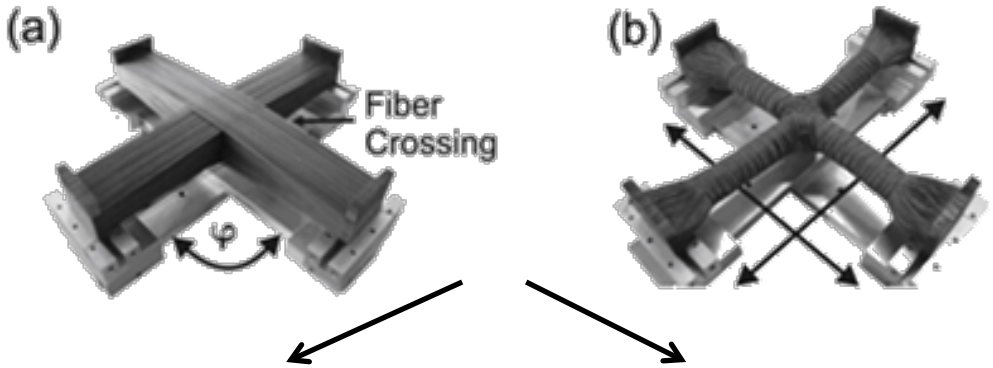
This magnetization are captured by coils and after electrical and mathematical processing of this precession gives visual images.





Phantom Role

- Phantom is a model of human brain part, which consists tight winded fibers placed into the water reservoir
- These small fibers represents to brain axons
- According to studying subject, there are wide variety of phantom types.

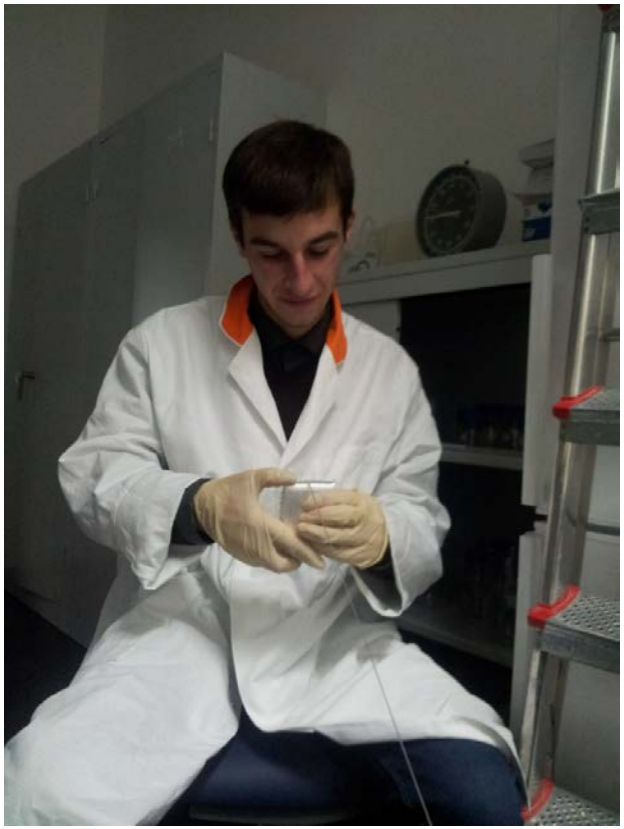


How well tomography working

How good is to use new parameter for analysis

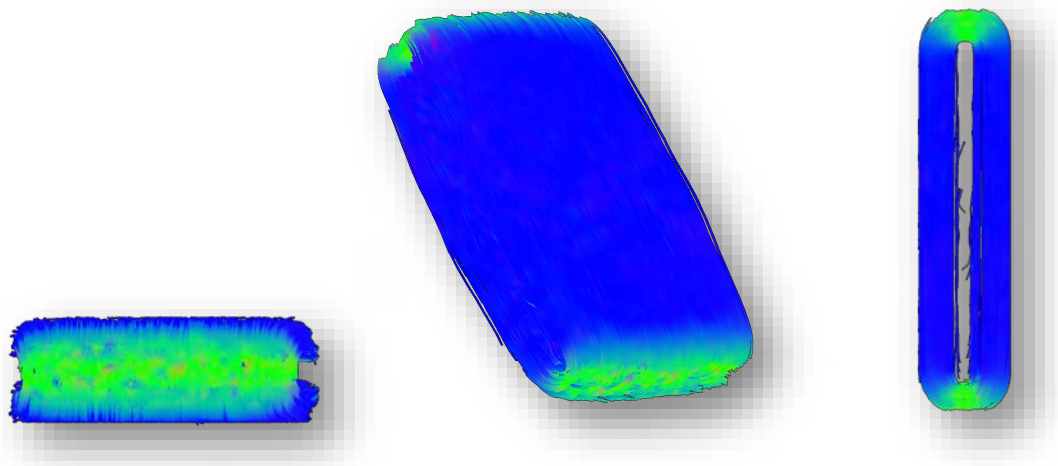
Experiences With Phantoms at FZJ

Internship 2012, IKP-2



Winding phantom

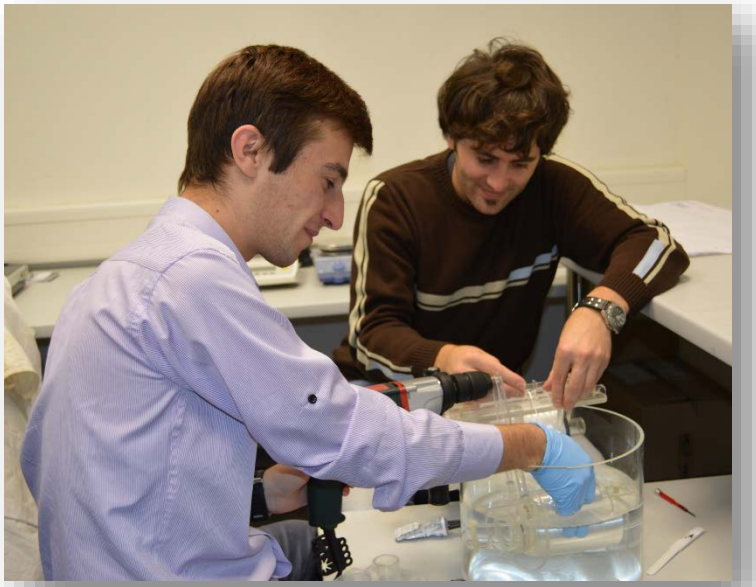
"Parallel Phantom"
~70cm^2 parallel area with 1,9cm thickness



Fiber directions

Experiences With Phantoms at FZJ

Internship 2013, INM-4

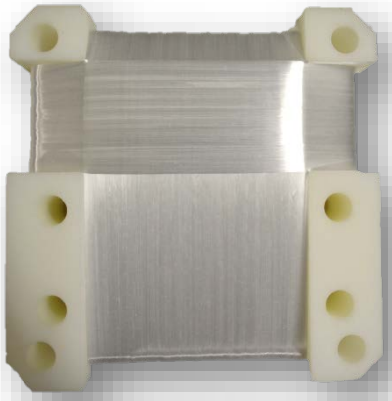


At September of 2013 I built device, which can wind very tight “Cylinder Phantom” and the processing time is also much less than usual

Winding machine for “Cylinder Phantom”

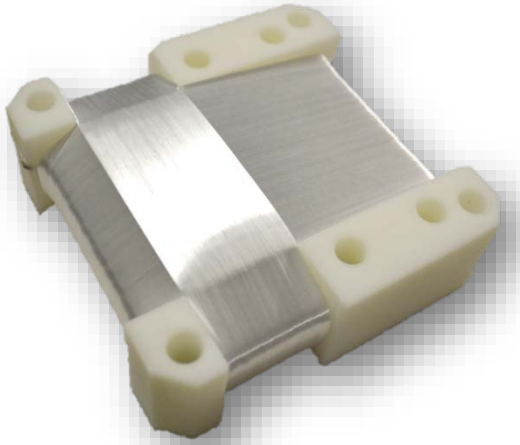
Experiences With Phantoms at FZJ

Internship 2013, INM-4



"Crossing Phantom"

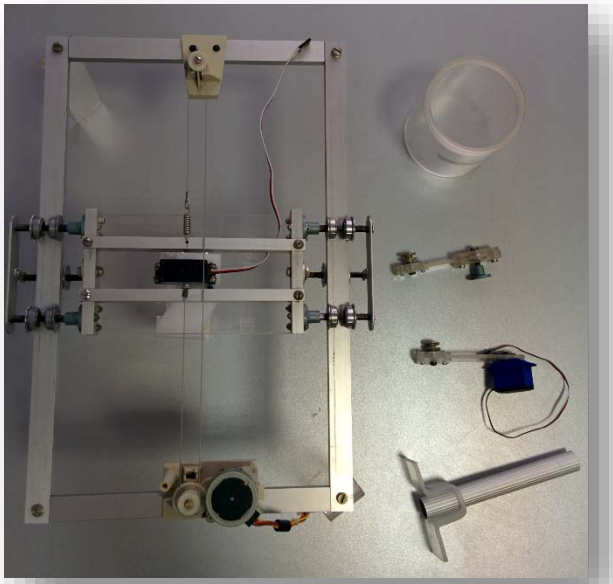
- Crossing area
- Parallel area
- Gradient density of fibers



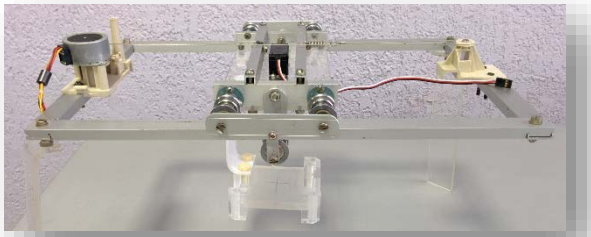
Water reservoir for MRI measurement

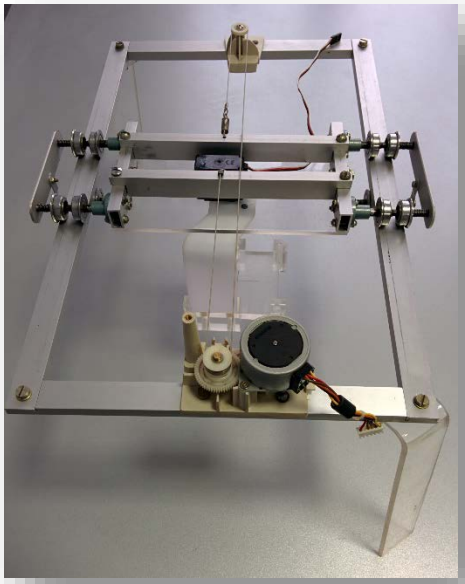
Works performed at GTU

- Phantoms have a significant role for testing new parameters and calibrating scanners
- Winding phantoms requires very accurate working
- It's possible to improve winding technology with using automated controlled devices.



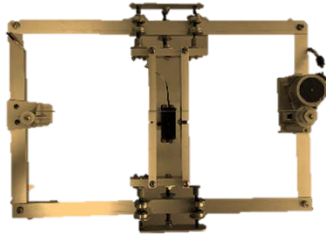
Winding device for
"Crossing Phantom"





Next Steps

- Finish constructing



- Wind “Crossing Phantom” with automated controlled device

- Test result on MRI scanner

Thank You For Your Attention