MR PHYSICS FOR DUMMIES

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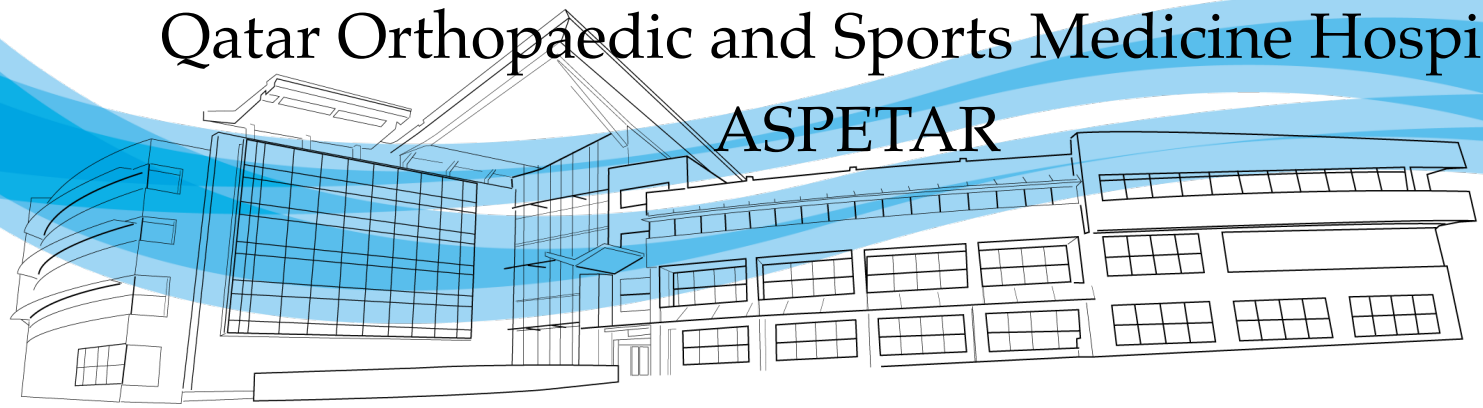
ASPETAR



Outline

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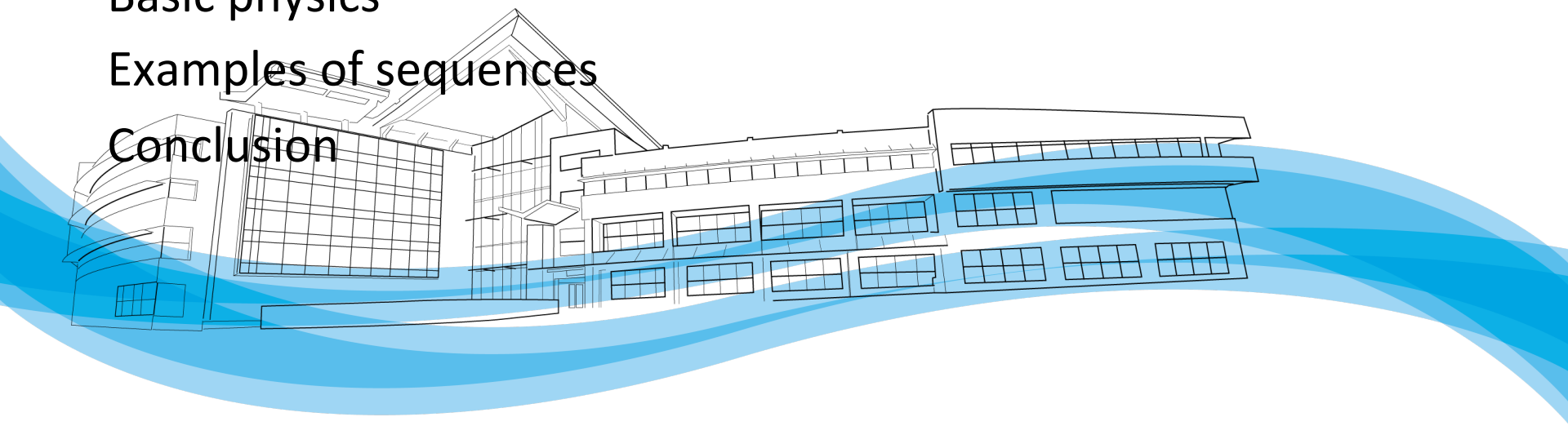


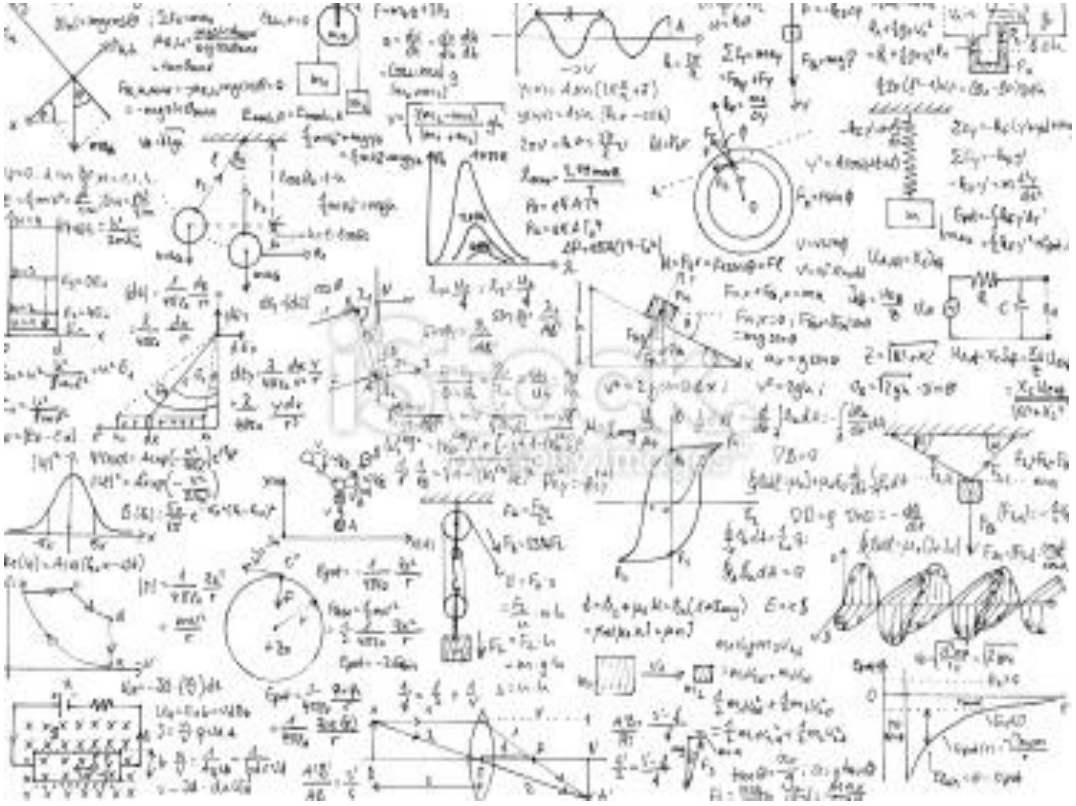
Introduction

- Magnetic resonance imaging (MRI) is based on the physics principle nuclear magnetic resonance (NMR)
- NMR deals with the interaction of atomic nuclei, radiofrequency energy and a strong magnetic field

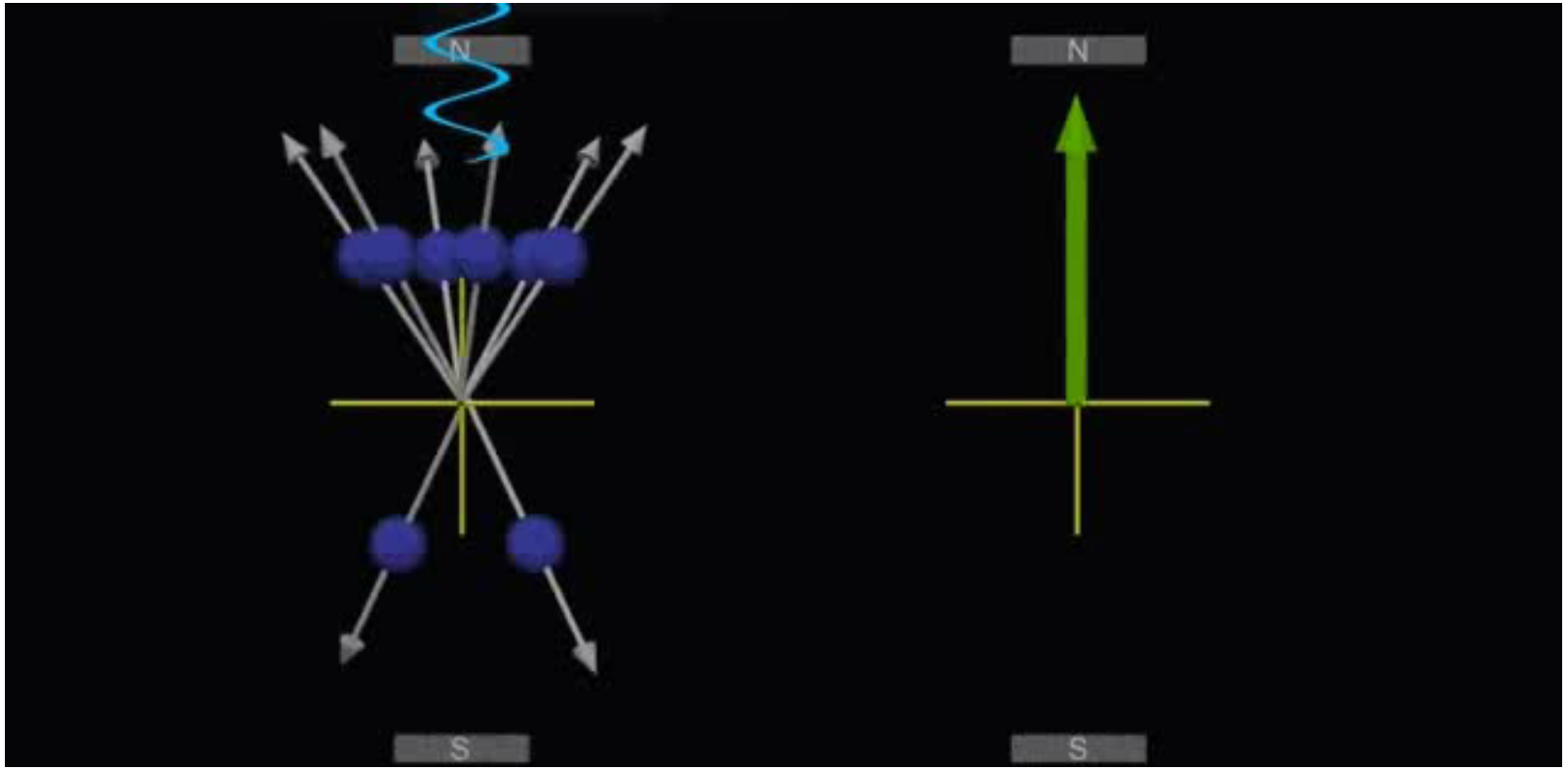
Introduction

- Dr. Isidor Rabi discovered NMR in late 1930's
- 1952 - Bloch and Purcell get Nobel prize for work with MR
- 1977 – first MRI on human was performed

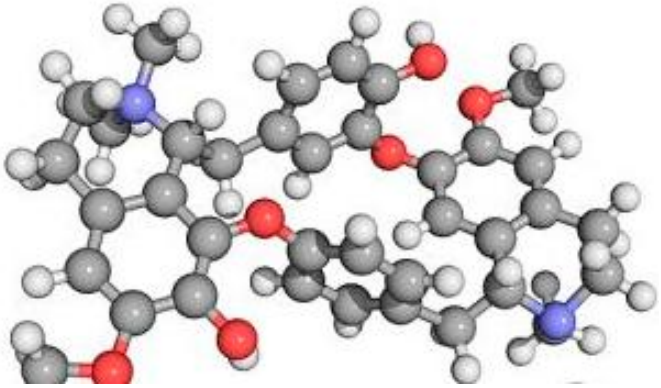
Basic Physics

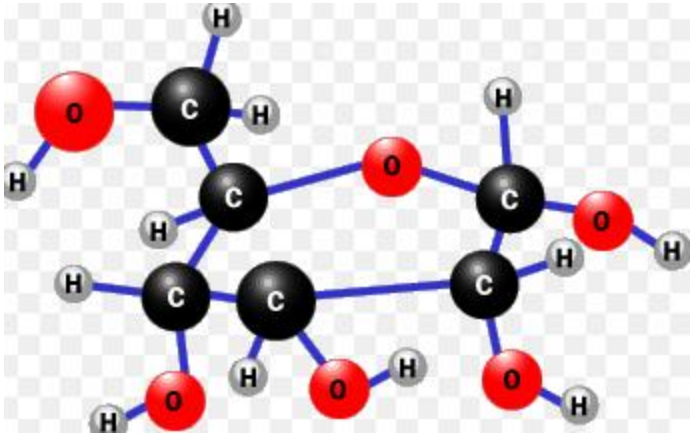


Basic Physics



Basic Physics





Basic Physics

Tissue type	Approx T1 value (ms)	Approx T2 value (T2)
Adipose tissue	240-250	60-80
Whole blood (oxy)	1350	50
Whole blood (deoxy)	1350	200
CSF (similar to H20)	4200-4500	2100-2300
Liver	490	40
Muscle	860-900	50
Grey Matter	920	100
White matter	780	90

Sequences

- T1
- T2
- PD
- GE
- DWI
- ADC
- FLAIR
- STIR
- fMRI
- Perfusion

Sequences

- Low TR (<750msec)
- Low TE (<20msec)

Sequences

- High TR (>1500 msec)
- High TE (>75 msec)

Sequences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PR
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Inversion Time:
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FLP
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C : 00514


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Conclusion