

Magnetic Resonance and Medical Imaging

4th year /Medical Physics

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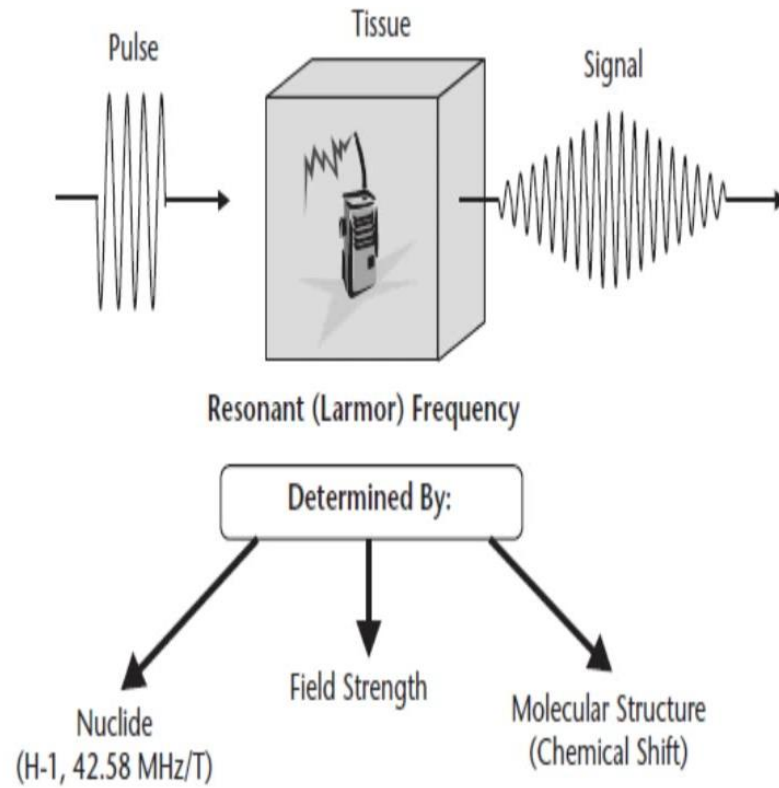
- NMRI or MRI ?
 - Opportunities in MRI
 - Tomographic Imaging
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- Microscopic property responsible for MRI
 - Units Review
 - Problems

NMRI or MRI ?

- Magnetic resonance imaging (MRI) is an imaging technique used primarily in medical settings to produce high quality images of the inside of the human body.

- MRI is based on the principles of nuclear magnetic resonance (NMR), a spectroscopic technique used by scientists to obtain microscopic chemical and physical information about molecules.
- The technique was called magnetic resonance imaging rather than nuclear magnetic resonance imaging (NMRI) because of the negative connotations associated with the word nuclear in the late 1970's.
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MAGNETIC RESONANCE



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Open



patient friendly
Cheap



low field
Low image Quality
Sensitive to interference
Sensitive to temperature

Types of MRI

Closed

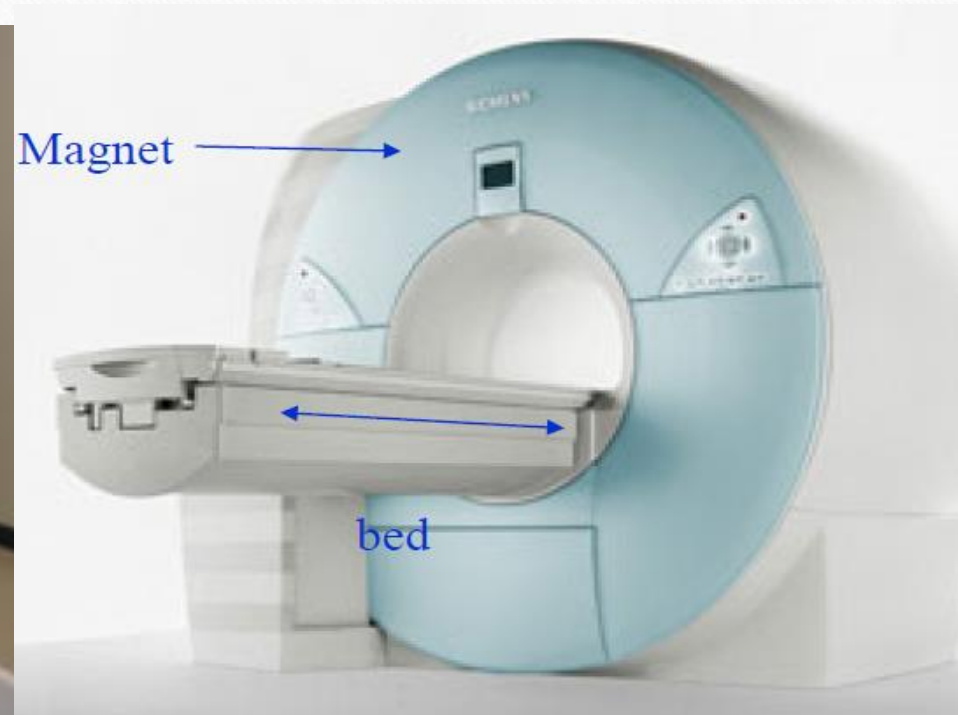


High field
High image Quality
Less sensitive



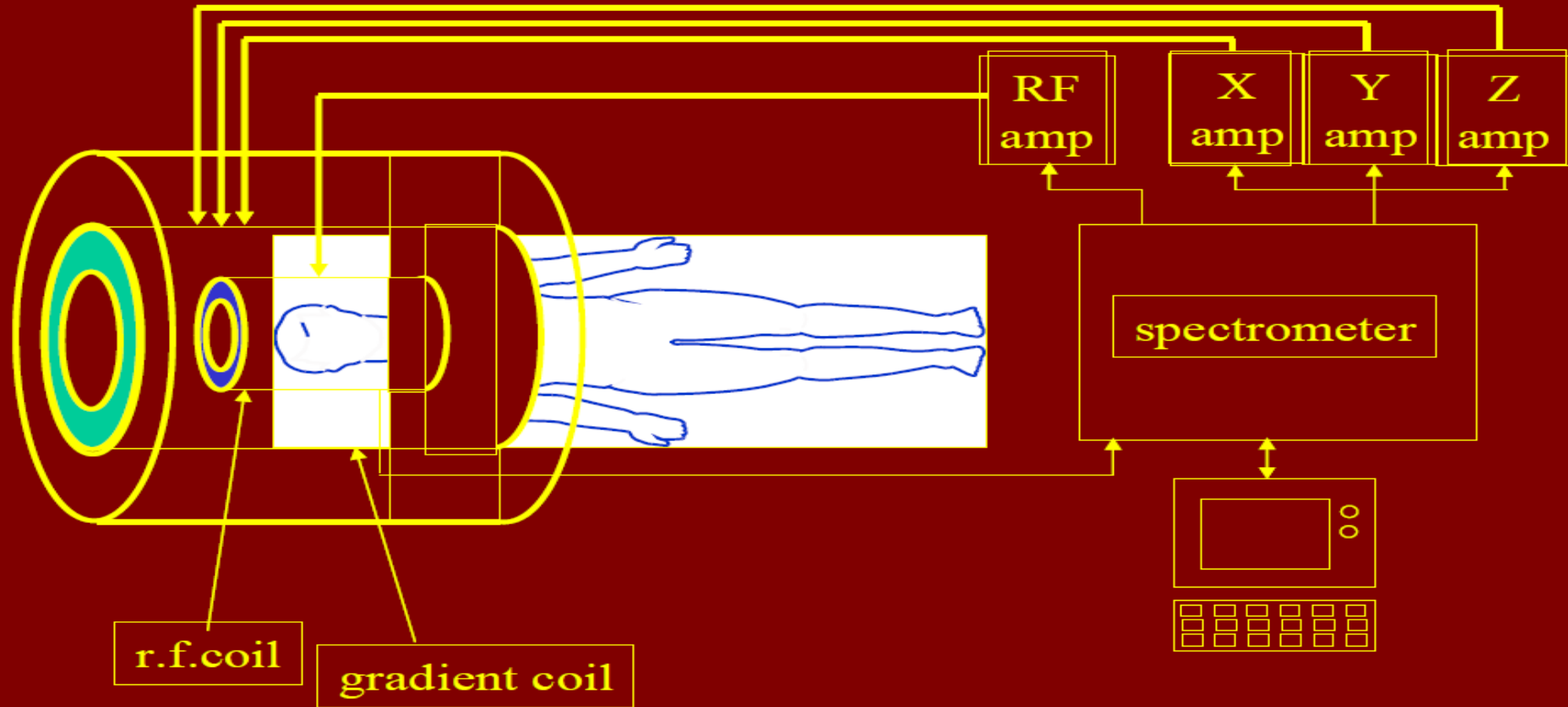
Expensive
Less patient friendly

- **Magnetic Resonance Imaging (MRI)** is a non-invasive imaging technology that produces three dimensional detailed anatomical images.
 - It is often used for disease detection, diagnosis, and treatment monitoring. It is based on sophisticated technology that excites and detects the change in the direction of the rotational axis of protons found in the water that makes up living tissues.
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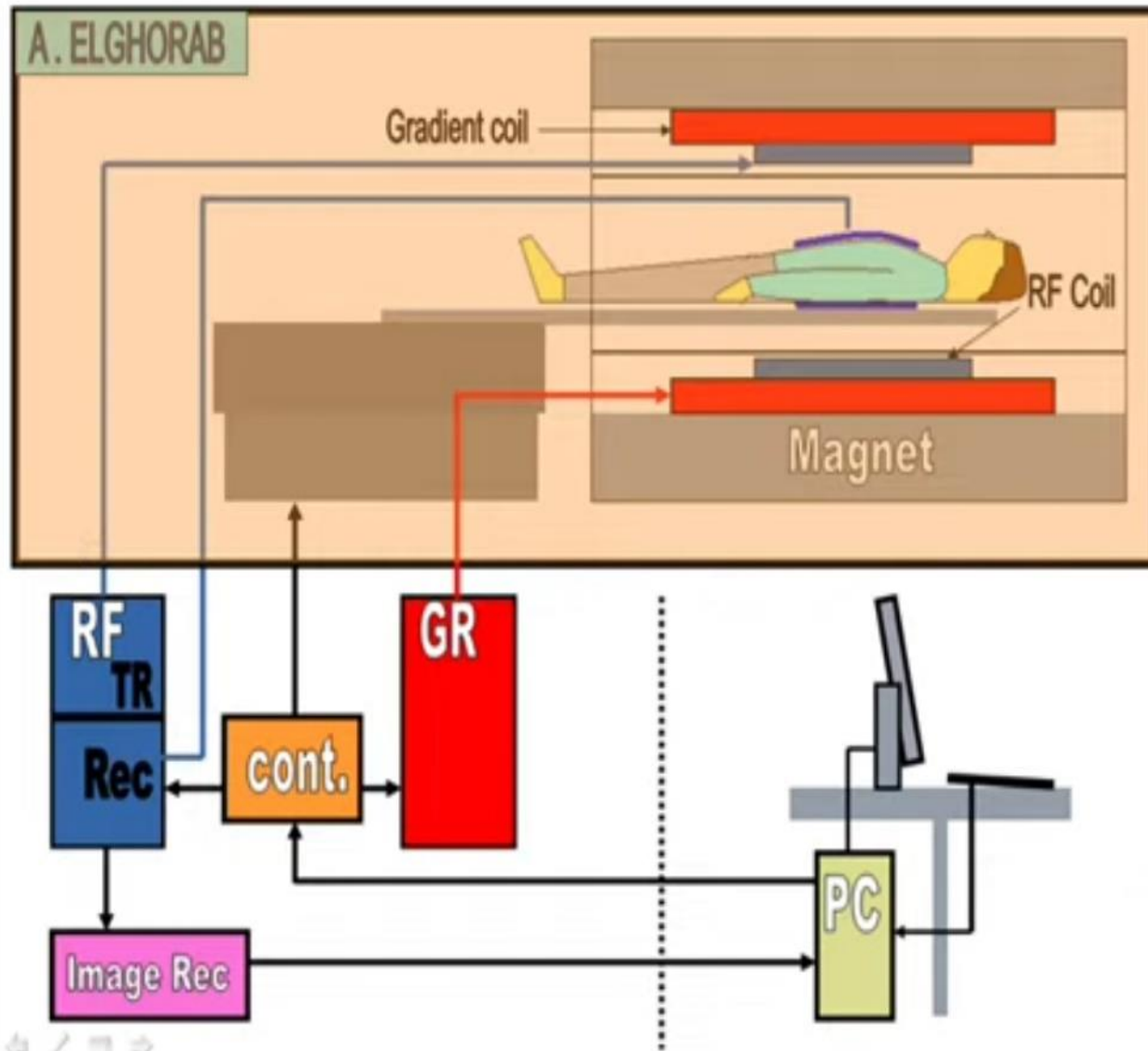


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- Before beginning a study of the science of MRI, it will be helpful to reflect on the brief history of MRI.
 - Felix Bloch and Edward Purcell, both of whom were awarded the Nobel Prize in 1952, discovered the magnetic resonance phenomenon independently in 1946.
 - In the period between 1950 and 1970, NMR was developed and used for chemical and physical molecular analysis

MRI System Block Diagram



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MR machine

