SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

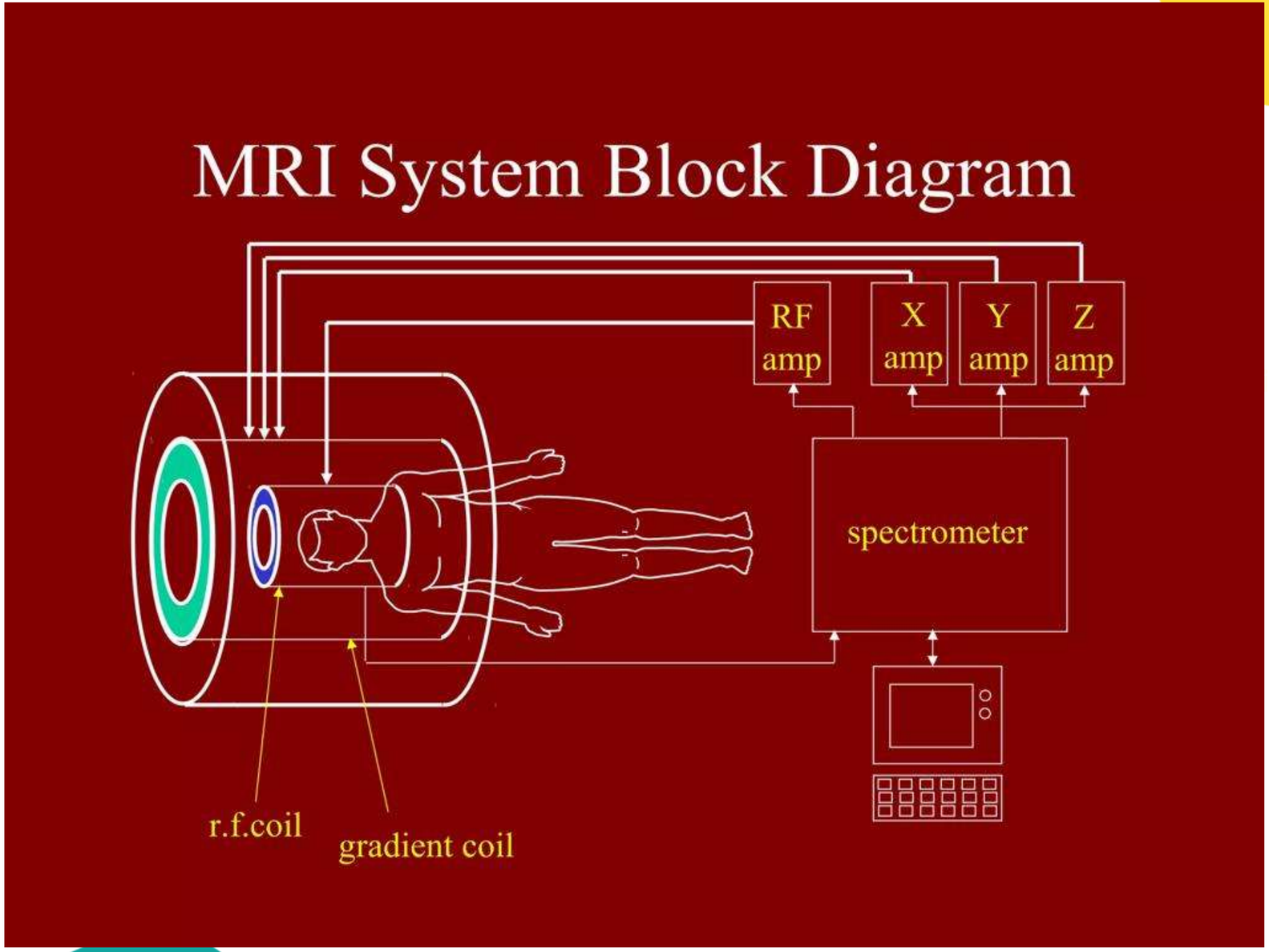
Approved by AICTE & Affiliated to Anna University
Accredited by NBA & Accrediated by NAAC with 'A+' Grade,
Recognized by UGC saravanampatti (post), Coimbatore-641035.

Department of Biomedical Engineering

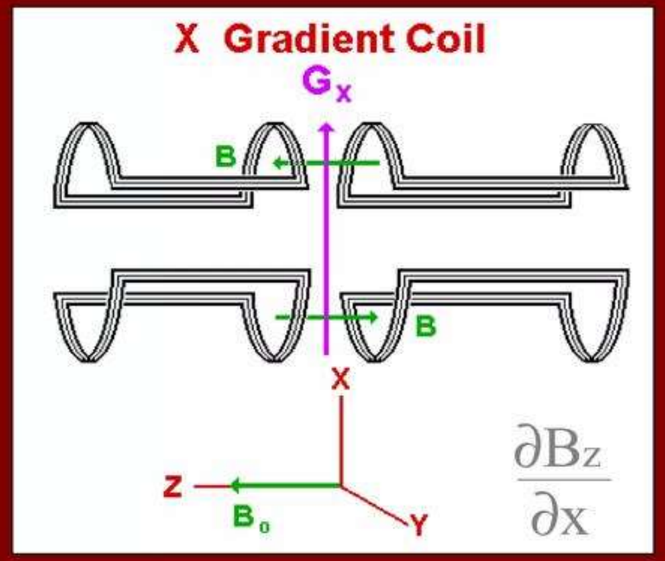
Course Name: RADIOLOGICAL EQUIPMENT

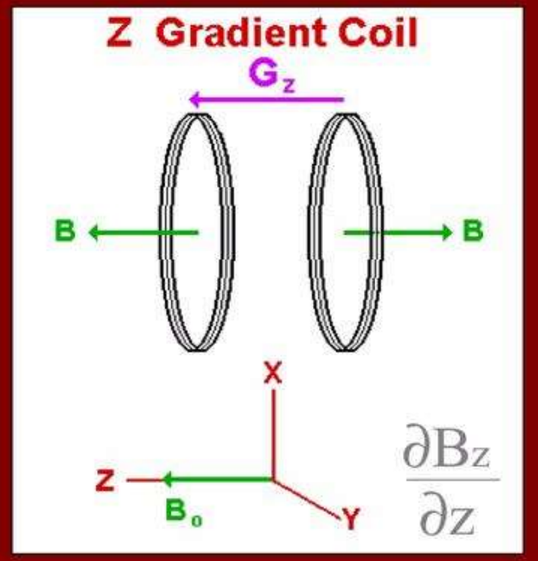
III Year : V Semester

TITLE: MRI BLOCK DIAGRAM APPROACH


MRI System Block Diagram
RF amp
X amp
Y amp
Z amp
spectrometer
r.f.coil
gradient coil

Principle of Gradient Coil





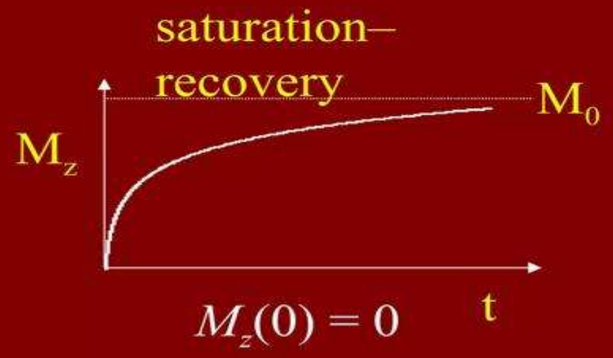
Common NMR Active Nuclei

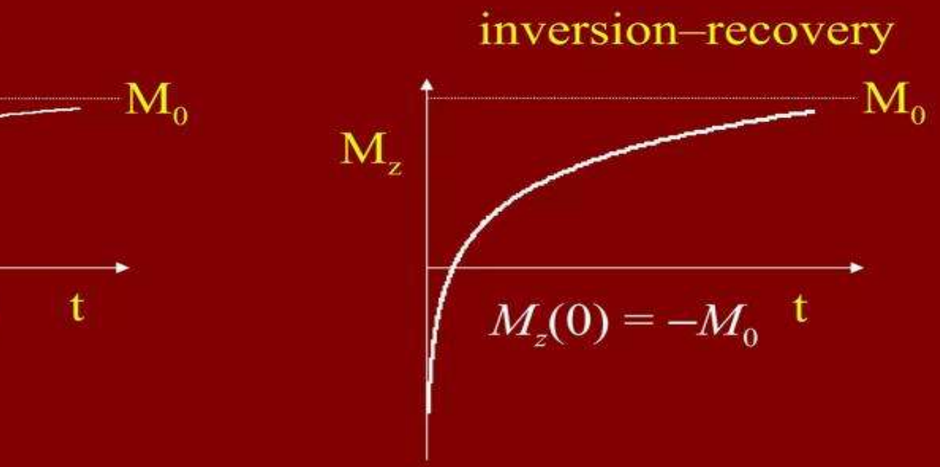
Isotope	Spin *I*	%age abundance	γ MHz/T
^{1}H	1/2	99.985	42.575
^{2}H	1	0.015	6.53
^{13}C	1/2	1.108	10.71
^{14}N	1	99.63	3.078
^{15}N	1/2	0.37	4.32
^{17}O	5/2	0.037	5.77
^{19}F	1/2	100	40.08
^{23}Na	3/2	100	11.27
^{31}P	1/2	100	17.25

T1 Relaxation

$$\frac{dM_z(t)}{dt} = -\frac{[M_z(t) - M_0]}{T1}$$

$$M_z(t) = M_0 + \{M_z(0) - M_0\}\exp(-t/T1)$$

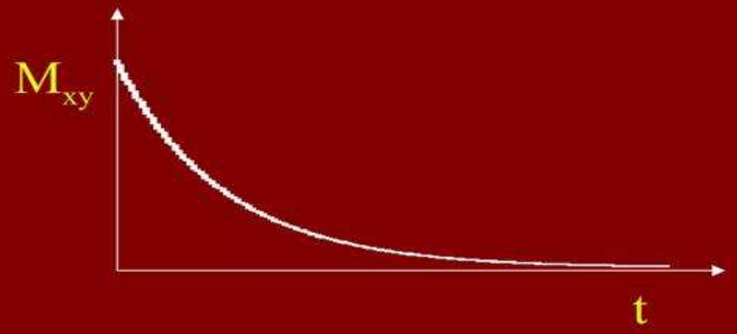


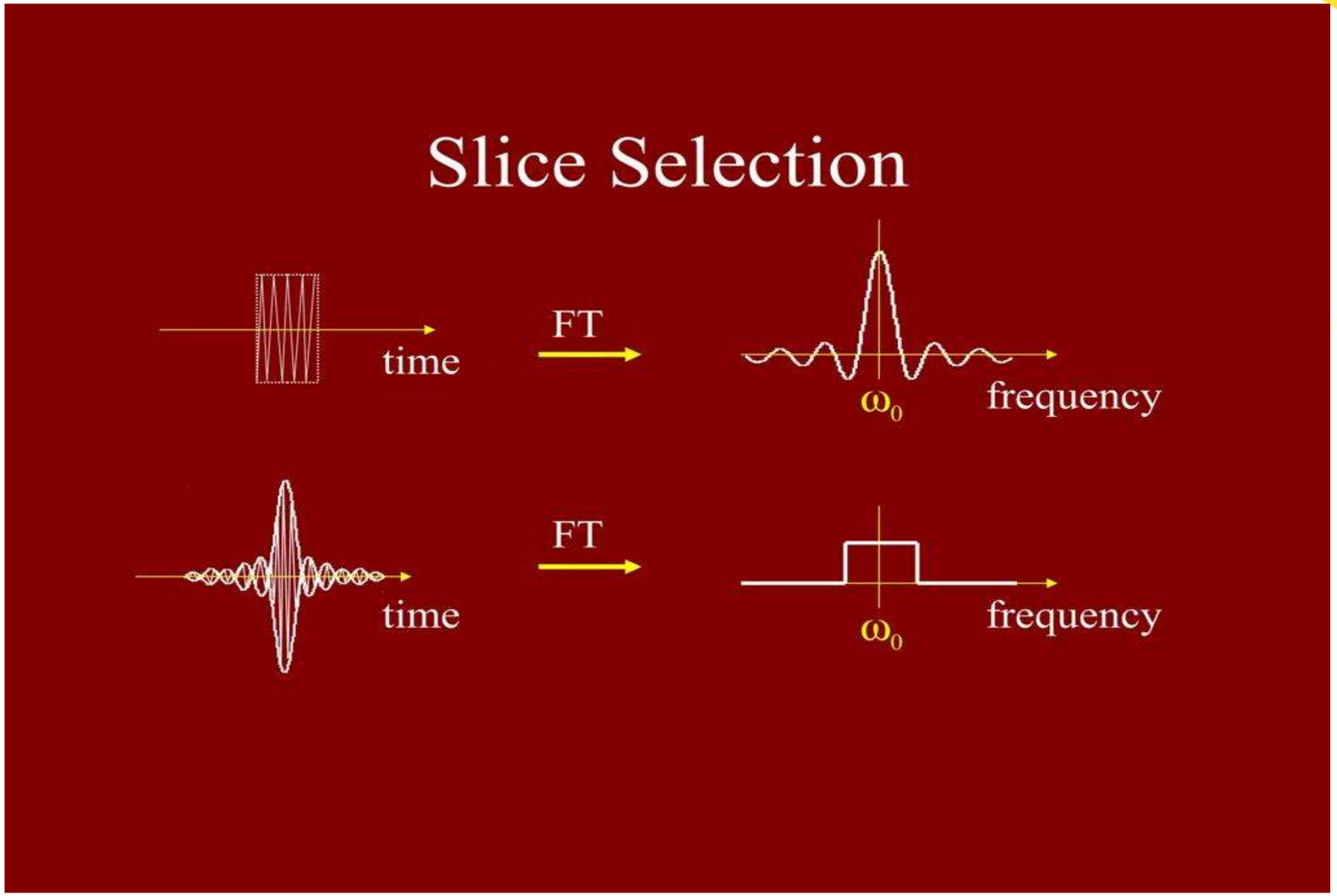


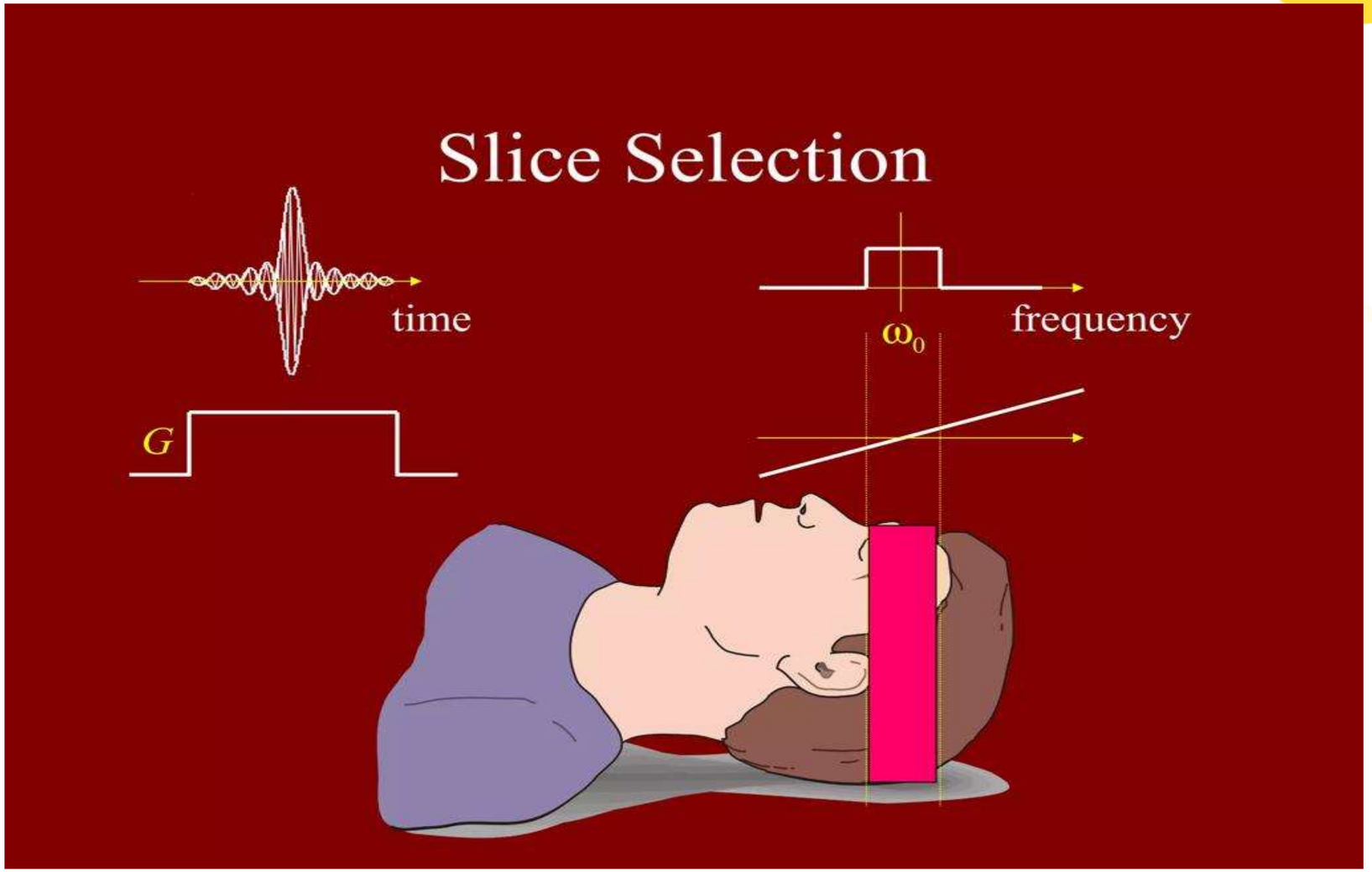
T2 Relaxation

$$\frac{dM_{xy}(t)}{dt} = -\frac{M_{xy}(t)}{T2}$$

$$M_{xy}(t) = M_{xy}(0)\exp(-t/T2)$$




Slice Selection
time
FT
ω_0
frequency
time
FT
ω_0
frequency


Slice Selection
time
frequency
ω_0
G