LECTURE 1

MICROWAVE I

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By

Assoc.Prof. Dr. Maged Marghany

COURSE OUTLINE

1. Introduction to Radar
2. RADAR Platform
3. SAR Image Formation
4. SAR Image Characteristics
5. Data Products
6. Image Quality and Calibration
7. Radiometric Enhancement
8. Geometric Characteristics
9. Classification and Information Extractio
10. Radar Polarimetry

Course Assessment

Assignment	15%
Lab. Report	15%
Take Home Exam	20%
Final Exam	50%

BASIC OF ELECTROMAENTIC WAVES

Simple oscillations

- period, frequency, amplitude

BASIC OF ELECTROMAENTIC WAVES

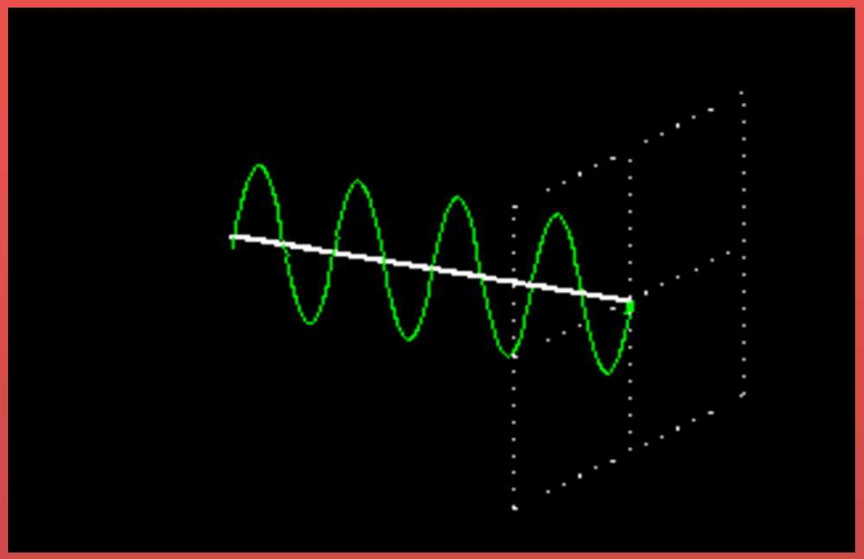
Many simple oscillations -> waves

Wavelength,

Speed = wavelength X frequency

BASIC OF ELECTROMAENTIC WAVES

Electromagnetic waves are produced by oscillations of charges!



$$E_y = A\sin(x/\lambda - \omega t)$$

Vertically (y axis) polarized wave having an amplitude *A*, a wavelength of λ, and an angular velocity (frequency * 2π) of ω, propagating along the x axis.

ELECTROMAGENTIC AND MICROWAVE

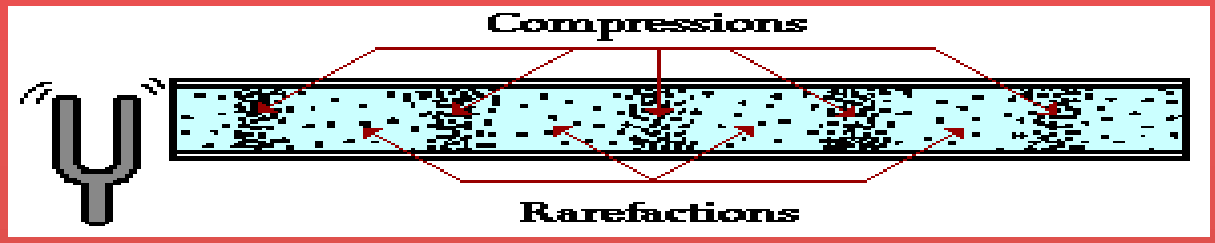
Radio waves are one form of electromagnetic radiation

Electromagnetic radiation has a dual nature:

- In some cases, it behaves as waves
- In other cases, it behaves as particles (photons)

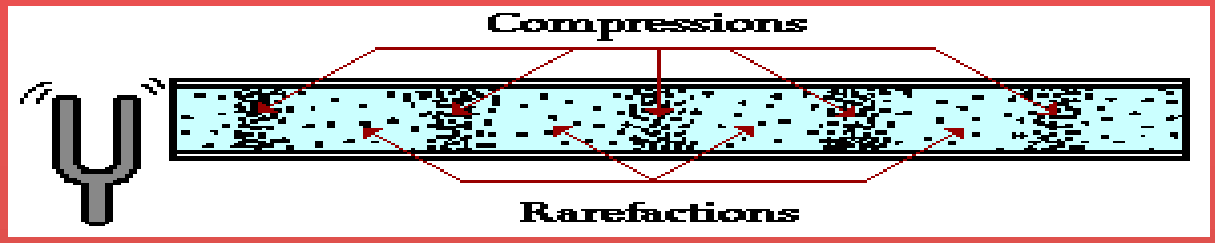
For radio frequencies the wave model is generally more appropriate Electromagnetic waves can be generated by many means, but all them involve the movement of electrical charges

WAVE TYPES



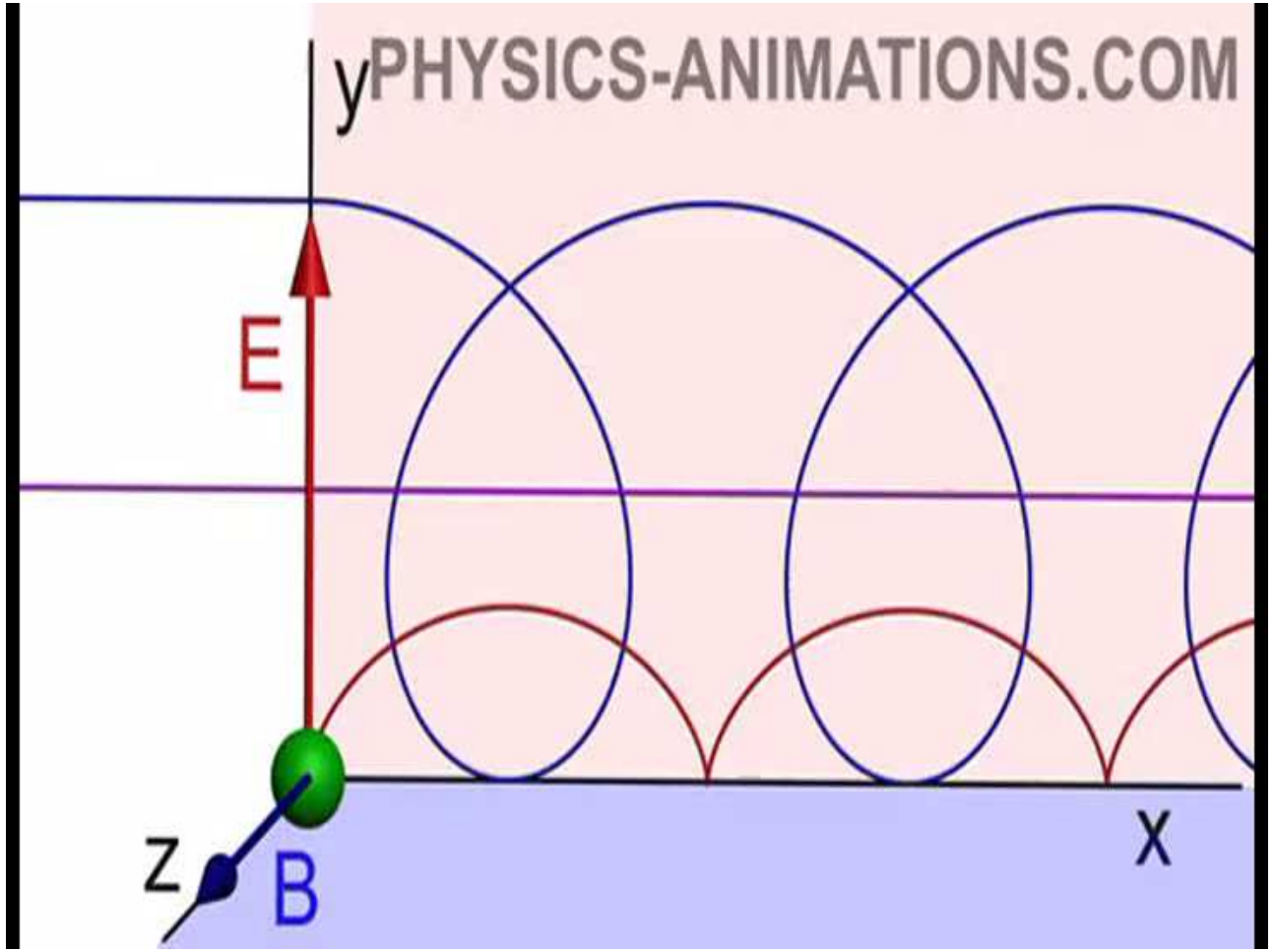
COMPRESSIONS – part of the wave where the particles are CLOSE (crowded) together.

WAVE TYPES



RAREFRACTIONS – part of the wave where the particles are SPACED APART.

ELECTROMAGENTIC WAVE PROPOGATION



ANOTHER LOOK