Change in E produce magnetic field

Int B\*dl = mu\_{0}epsilon\_{0}(dphi\_{E})/(dt)

Phi\_{e} is the E through the area bounded by the closed path along which line integral of B calculated

Value of magnetic field at some point

Int B\*dl = mu\_{0}i

Direction of em wave is direction of E xx B

Int B\*dl = mu\_{0}(i + i\_{d})

i\_{d} = epsilon\_{0}(dphi\_{E})/(dt) = C(dV)/(dt)

phi\_{E} is flux due to E, i\_{d} is displacement current, V is the potential

current due to flow of charge is called conduction current so

int B\*dl = mu\_{0}(i\_{c} + i\_{d})

faradays law: change in magnetic field give rise to electric filed

int E\*dl = (-dphi\_{B})/(dt)

maxwells equation

intE \*ds = q\_{text(enclosed)}/epsilon\_{0}

int B\*ds = 0

intE\*dl = (-dphi\_{B})/(dt)

int B\*dl = mu\_{0}(i\_{c} +i\_{d})

during charging of capacitor

i\_{d} = i\_{c} (between plates)(`i\_{d}` cause change inE between plates)

electromagnetic waves

stationary charge only produces E

charge in uniform motion(or steady current) produce E and B

accelerated charges produce E, B and electromagnetic waves

oscillating charged particle is source of em wave

a charged particle oscilating with a frequemncy f produce oscillating E which becomes a source for oscillating B this becomes a source for oscillating E and so on

both E and B regenerate eacg othe and electroimagnetic wave propagates through space(same frequency of that of oscilallating charge)

E, B and electromagnmetic wave(velocity) perpendicular to each other

Eg: EM wave along z-direction

E\_{x} = E\_{0}sin(omegat – kz)

B\_{y} = B\_{0}sin(omegat – kz)

k = (2pi)/lambda omega =2pif

c = omega//k = flambda = E\_{0}/B\_{0} = 1/(sqrt(epsilon\_{0}mu\_{0}))

unlike mechanical waves em waves don’t need a medium they are self sustaining

In medium : v depend on the electric and magneti properties of medium

v = (sqrt(epsilonmu))

EM waves carries energy and momentum

lambda A deg = 12400/(text(energy in eV))

U = energy density

U\_{E} = 1/2epsilonE^2

U\_{B} = B^2/(2mu\_{0})

U = U\_{E} + U\_{B}

E\_{rms} = E\_{0}/ sqrt(2)

B\_{rms} = B\_{0}/ sqrt(2)

Missing

Intensity of em wave

I = U\_{av}c = (text(power))/(text(area))

Momentum transported by em wave

P = U/c (for complete absorption)

P = (2U)/c (for complete reflection)

Radiation pressure : Pressure excerted due to em wave

P\_{r} = I/c (for complete absorption)

P\_{r} = (2I)/c (for complete reflection)

EM spectrum

Lambda propto 1/gamma

`Lambda` is least for gamma ray

`Lambda` highest for radio wave

[((int\_0^T I^2dt)/(int\_0^T dt))^(1/2)] = I\_{rms}

(int\_0^T Idt)/(int\_0^T dt) = I\_{avg}

Radio rapid acceleration or declleration of electron in areils

Microwave klystron valve or magneto valve

Infrared vibration of atoms and molecules

Light electrons in atoms emit light when they move to lower energylevel

UV inner shell electrons in atome moving from one ernergylevel to lower energy level

X-rays X-ray tubes or inner shell electrons

Gamma rays radioactive decay of the nucleus

Microwaves are used in radar, in oven(it isbetter than burners as direct fodd gets heated no vessel heating)

Infrared waves are called heat waves, gren house effect

Visible light: violet = 400nm , red = 700nm

UV : LASIK eye surgery, ozone