

Kishlay Singh 2003/21005

Quel > 8=105, Fp=10KeV

 $hv = 10 \times 10^{3} \times 1.6 \times 10^{-19}$   $v = 1.6 \times 10^{-15} = 2.41 \times 10^{18} \text{ Hz}$   $6.63 \times 10^{-34}$ 

We know that in Synchrotron emission, charatustiff frequency is given by:

Vo = 38<sup>2</sup> eB 4TT me C

Substituting the values, we find that:

2.41 X108 = 3 X1010 X T.6×10-19 X B+3×108

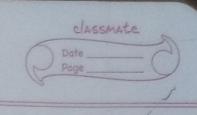
YXTT X511 X103 X T.6×10-19

B = 1.721 × 106 Tesla

Now, If the emmited Synchrotron photon undergoes Sovere Compton Scatterny with the Same electron, then energy of the Sovere Compton photon is given by:

<E>> = 4 82 €

= 4 x(105) 2 X10 x103 eV = 1.3 X10 14 eV



One 2 > We Know

Lold = 3.2 x10 (M) Lo

Now, Diameter of Event hoteron = 3×10° ×90×60 m = 1.62×1012 m (DZCAE)

Radius => R = 1.62 x1012 = 0.81 x102 m

Now, Schwarzschild Madius, Rs = 26M

Thus,  $26M = 6.81 \times 10^{12} = 7 M = 0.81 \times 10^{12} \times 9 \times 10^{16}$  $C^2$   $2 \times 6.67 \times 10^{-1}$ 

M = 8.65.46 × 1038 Kg = 2.73×108 MO

Que3 > Ho = 73.8 km/see/Mpc = 2.39 ×10<sup>48</sup> s<sup>-1</sup>

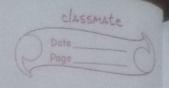
Liab wavelength of H- x time line is =556.28 nm
= 6562.8Å

Observed wavelength = 9000Å

Red Shift  $z = \frac{9000 - 6562.8}{6562.8} = 0.371$ 

Ar estimate of the distance may be bound by using the melation:

36 = d (Valid for only small redshifts)



ane 4 -> Given 77 4X107; Epn = 20KeV = hD

 $V = \frac{20 \times 10^{3} \times 1.6 \times 10^{-19}}{6.6 \times 10^{-24}} = \frac{4.83 \times 10^{19} \text{ Hz}}{10^{-24}}$ 

Evergy of electron: -

 $E = 8 \text{ meC}^2 = 10^7 \times 4 \times 10^7 \times 5 11 \times 10^3 \times 1.6 \times 10^{-19}$ = 32.7 erg

Power emailed is P = 1.7 ×10 8 ergls

(a) (boling time = T = E = 32.7 = 60.99 gears

Cooling time = 61 years.

Power P= 400000 4 cm (me)2 22 B2 8TT

= 4 x3 x 10!0 x 6.65 x 10-25 x 16 x 16 x 10 8 m x 10 8 m

= 1.69 ×10-8 \$ orgs-1