**RADIUS OF PHOTON ORBIT OF ROTATING BLACKHOLE**

**According to einstein mass energy equivalence relationship,mass of rotating blackhole is the measure of energy then total energy assosiated with the Blackhole is given by**

**E=Mc^2 where M=Mass of of rotating blackhole ,c=speed of light in vaccum(3\*10^8m/s)**

**As spin parameter of rotating blackhole is given by a=J/Mc**

**where M=Mass of of rotating blackhole,J=Angular momentum of rotating blackhole**

**By rearranging of equation a=J/Mc we get Mc=J/a.**

**Then the equation E=Mc^2 i.e E=(Mc)c i.e E= Jc/a where a= spin parameter of rotating blackhole.**

**Photon sphere is a** [**spherical**](http://en.wikipedia.org/wiki/Spherical) **region of space where** [**gravity**](http://en.wikipedia.org/wiki/Gravity) **is strong enough that** [**photons**](http://en.wikipedia.org/wiki/Photons) **are forced to travel in orbits.Consider photon of relativistic mass”m”is moving in these photon orbit (Photon sphere)**

**around the black hole.Then the gravitational force of rotating Black hole experienced by the photon is given byF=GMm/r^2 where G=Universal gravitational constant, M=Mass of of rotating blackhole,**

**m= relativistic massof photon,r=distance between rotating Black hole and photon(radius of photon orbit) .As total energy assosiated with the rotating Blackhole is given by E=Mc^2**

**then the equation F=GMm/r^2 becomes F=GEm/r^2 c^2 .As the total energy of rotating black hole is also given by E= Jc/a then the equation F=GEm/r^2 c^2 becomes F=GJcm/a r^2 c^2.**

**Thus F=GJm/a r^2 c is obtained. As gravitational force of rotating Black hole experienced by the photon.**

**Can also be given by F=mE where E=gravitational field intensity,F= gravitational force of rotating Black hole experienced by the photon of mass ‘m’moving in photon orbit.**

**By equating F=mE and F=GJm/a r^2 c**

**we get the equation r^2=GJ/aEc thus r=[ GJ/aEc]1/2 where r=radius of photon orbit opf rotating black hole G= Universal gravitational constant, J=Angular momentum of rotating blackhole, a= spin parameter of rotating blackhole, E=gravitational field intensity,c=speed of light in vaccum**