Process to Overcome the Fusion Energy

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Abstract

The paper contains the required parameters for extracting radiation energy through the decelerated masses with the application of recent theoretical point of views in the articles “Accelerated Mass as the Source of Electromagnetic Radiation” and “Gamma Ray Bursts: Theoretical Search for Enigmatic Flow of Energy”. Interestingly the model replicated as the short duration gamma ray bursts from the merger of stealer objects to reveal the process to overcome the fusion energy explaining the dependence of critical masses for different initial merger velocities to trigger the required energy explosion.

Keywords: Electromagnetic radiation, decelerated mass, gamma ray bursts, merger of massive objects, fusion

1. Introduction

From the mass energy equivalence the known processes for evolving plenty of energy with gamma radiations are nuclear reactions. For maximum energy output with highest transformation of mass in energy is .7% following the 4 hydrogens into 1 helium [10] in fusion exceeds the fission. But if we look for the cosmic explosions of gamma ray bursts (GRBs) then exceptionally it cross all the energy conversion processes. Basically in GRBs after the supernova the stealer core of mass with few suns mass undergone a rapid collapsing or merger of massive stealer objects[4-9] can immediately expose energy $\sim 10^{47}$ joules equivalent to complete evaporation of sun rest mass energy[4-6]. Thus the underlying process could hint the possible way to overcome the fusion energy. In the very recent article “Gamma Ray Bursts: Theoretical Search for Enigmatic Flow of Energy” it
has shown implying the theory of dynamic gravitational electromagnetism for accelerated mass how generation of radiation energy from GRBs can easily be obtained without having any empirical considerations [3]. So the followings will be the applications of these new theoretical perspectives.

2. The suitable choice to extract energy from the decelerated mass

It is no doubt imitating the process of gravitational collapse[4-7] is ultimately beyond the scope as it requires to gather masses greater than few solar masses and exclusively it is the natural playing in the distant galaxies[4-6]. But the merger of massive stealer objects [8, 9] can be replicated for extracting energies from decelerated masses in a suitable way by purely inelastic collisions between two massive objects. In this condition following the gravity induced electromagnetic radiation [2, 3] the energy out come for a single decelerated massive object will be in usual non-relativistic case when $u \ll c$

$$-\frac{dU(q)}{dt} d\Omega = \epsilon_0 cE^2 r^2 d\Omega$$ (1)

For $u$ and $\hat{u}$ are in same direction the electric field [2, 3]

$$E_{rad} = \frac{g_{mu}}{rc} \cos \theta \hat{u}$$ (2)

Where angle between $-\hat{u}$ and $r$ is $\theta$ as in Fig-1

$$\epsilon_0 cE^2 r^2 \cos \theta d\phi d\theta$$

Fig-1

the gravity induced radiation through elementary surface $r^2 d\Omega$
Ultimately the directional gravitational electromagnetic radiation from equations (1) and (2) is
\[
-\frac{dU(\theta)}{dt} d\Omega = \frac{e_o G^2}{c} m^2 u^2 \dot{u}^2 \cos^2 \theta \sin^2 \theta d\Omega
\]
Here \( e_o = 8.856 \times 10^{-12} \text{F/m} \)
\( G \approx 6.674 \times 10^{-11} \text{ S.I. and } c = 3 \times 10^8 \text{m/s} \)

3. Parameters and energy outcome

The rate of energy flow through entire surface at large distance surrounding the source using equation (3) where from the Fig-1 \( d\Omega = \cos \theta d\varphi d\theta \)
\[
-\frac{dU}{dt} = -\int d\Omega \frac{dU(\theta)}{dt} = -\frac{e_o G^2}{c} m^2 u^2 \dot{u}^2 \int_{-\pi/2}^{\pi/2} \cos^3 \theta \sin^2 \theta d\theta \int_0^{2\pi} d\varphi
\]
Now at any instant \( t' \) for uniform deceleration \( \dot{u} \) velocity \( u = u_0 - \dot{u} t' \) and considering short collision time or decelerated period \( \Delta t' \) the total radiated energy
\[
-U = -\int_0^{\Delta t'} \frac{dU}{dt} dt' = \frac{8 \pi e_o G^2}{15c} m^2 u^2 \int_0^{\Delta t'} (u_0 - \dot{u} t')^2 dt'
\]
Substituting initial velocity \( u_0 = \dot{u} \Delta t' \)
\[
-U = \frac{8 \pi e_o G^2}{45c} m^2 \frac{u_0^4}{\Delta t'}
\]
Interestingly it could be achieved from equation such that radiated energy exceeds the initial kinetic energy \( (T=\frac{1}{2} m u_0^2) \) for the moving objects. In this condition the minimum initial kinetic energy \( T_m \) for the objects will be
\[
T_m = \frac{45c}{32 \pi e_o G^2} \Delta t'
\]
In a similar way it is possible to cross the limit for maximum conversion of mass into fusion energy (.7%).the critical mass \( (m_c) \) to overcome this limit
\[
-\frac{U/c^2}{m_c} = 7 \times 10^{-3}
\]
\(-U/c^2 \) equivalent mass for the radiated energy from the massive object at the deceleration period \( (\Delta t') \)
\[
m_c = 8.583 \times 10^{54} \frac{\Delta t'}{u_0^4}
\]
Choosing the deceleration period very short as observed in the most cases for short duration $1s < \Delta t' < 2s$ gamma ray bursts [8, 9] from the merger of stealer objects

$$m_c \sim \left( \frac{10^{55}}{u_0} \right) Kg$$  \hspace{1cm} (10)

Equation (10) ultimately explains the dependence of critical masses for the colliding velocities of the objects for a fixed collision period ($\Delta t'$).

From equation (10) for possible bursts for the objects with sun’s mass $\sim 10^{30} Kg$ and earth’s mass $\sim 10^{24} Kg$ require velocities $\sim 1800$ Km/s and $\sim 38000$Km/s respectively.

Further using equation (8) for two colliding stealer objects say neutron stars each with critical mass as solar mass $\sim 10^{30} Kg$ can produce gamma ray burst with energy $\sim 10^{45}$ joules, obviously acceptable for the short duration GRBs[8,9].

4. Conclusions

The result in the above is not impossible if we look at the origin of gamma ray bursts resulting from the merger of two massive stealer objects [8, 9]. Equation (9) indicate the crossing of the limit of fusion energy at critical masses in a conserved rest masses of the objects .Here there is no violations in energy conservation because the limits are overcome due to associated gravitational extra potential energy [1] at the cost of systems self gravitational energy as same to the required dissociation energy over gravitational pull between the massive objects.

References

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