

Brookhaven Particle Beam Energy Calculations,

by Steven J. Smith

3.2.1

Particle beam overview:

The following are direct quotes from a public relations document called "RHIC by the Numbers", published by the Brookhaven National Laboratory (BNL).

Quote 1:

RHIC's beam travels at 99.995 percent the speed of light (186,000 miles per second, or more than 300,000,000 meters per second).

Quote 2:

RHIC's beam is not continuous - it's made up of 57 separate "bunches," each containing billions of ions.

Quote 3:

RHIC ions are so small that, even at nearly the speed of light, the force of their impact is about the same as the impact of two mosquitos colliding.

From the BNL website, we discover that gold (Au) atoms are used for the particle beam.



RHIC Tunnel. Photo Courtesy of BNL

3.2.2

Particle beam energy calculations:

The energy contained in any moving object, be it a car, snow ball, or particle beam composed of gold atoms is calculated as follows:

$$[\text{Eq. 1}] \quad E = \frac{1}{2}MV^2$$

Where:

E = Energy in Joules.

M = Mass in kilograms.

V = Velocity in meters per second.

The mass of a gold atom is $3.2697 \cdot 10^{-21}$ grams, and the mass of 2 billion gold atoms is $6.5394 \cdot 10^{-12}$ grams or $6.5394 \cdot 10^{-15}$ kilograms. Thanks to Einstein's relativity, the effective mass of any object traveling near the speed of light increases by:

$$[\text{Eq. 2}] \quad M' = M \frac{1}{\sqrt{1 - \frac{V^2}{C^2}}}$$

At 99.995% of light speed, the effective mass is slightly more than 100 times the rest mass, therefore our

2 billion gold atoms have an effective mass of 6.5394^{-13} kilograms. Next, the speed of light is 299,792,458 meters per second in a vacuum, and 99.995% of light speed is 299,777,468 meters per second.

Therefore:

$$E = 6.5394^{-13} * 299,777,486^2 * 0.5 = 29383.7 \text{ Joules}$$

And since the RHIC stores 57 "bunches" or packets of particles, the total energy is: $57 * 29383.7 = 1,674,871$ Joules. This is nearly 3 times the energy of a 3500 pound automobile crashing into a wall at 60 miles per hour! And all of this energy concentrated into 57 packages, each smaller than the period at the end of this sentence, AND traveling at nearly the speed of light.

It seems quote number 3 (above) tells the truth, but **NOT** the whole truth...

It should be mentioned that according to BNL, the RHIC did not produce a particle beam until July, 1999.

However, given the covert nature of DOE, this date is suspect. Furthermore, as the line drawn on the aerial photo of BNL clearly shows, the AGS ring is also capable of supplying particle beams to the weapons system buildings.

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correct theory cohesively
explains all facts and
evidence, both present and
as yet unknown.

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