Answer on question #53485, Physics / Relativity

Question Suppose that the starship Enterprise from Star Trek has a mass of 8.0×10^7 kg, about the same as the Queen Elizabeth 2. Suppose that it was moving at half the speed of light. Read its G o of the graph in gure l on p. 76, and use this to compute its energy. Compare with the total energy content of the worlds nuclear arsenals, which is about 10^{21} J.

Solution Let us find gamma factor

$$\gamma = \frac{1}{\sqrt{1 - v^2/c^2}} = \frac{1}{\sqrt{1 - 0.5^2}} \approx 1.1547$$

Total energy of the starship is

$$E = \gamma m c^2 = 1.1547 \cdot 8.0 \times 10^7 \cdot (3 \cdot 10^8)^2 \approx 8.3 \cdot 10^{24}\, J$$

Thats much bigger, then worlds nuclear arsenals.