

Special Relativity: The Brigitte/Emmanuel Paradox

Pavle I. Premović

Laboratory for Geochemistry, Cosmochemistry and Astrochemistry,
University of Niš, pavleipremovic@yahoo.com, Niš, Serbia

The Special relativity (SR) equation for time dilation is

$$T = T_0 \sqrt{1 - v^2/c^2}$$

Where T is the dilated time experienced by the moving observer, T_0 is the time experienced by the observer at rest, v is the speed of the moving observer and c ($\approx 3 \times 10^8 \text{ m sec}^{-1}$) is the speed of light.

Let's consider the following example to illustrate the SR dilation using the above equation. Suppose there are two 1-month-old babies Brigitte and Emmanuel. Brigitte stays on Earth, while Emmanuel was taken in a spaceship traveling at a speed v of about $2.55 \times 10^8 \text{ m sec}^{-1}$ or $v \approx 0.85c$ to a distant star and back. Suppose also that the star is 7.5 years away from Earth. The spaceship to return to Earth needs ($T_0 =$) 15 years. When it happens, Emmanuel would be 15 years old, but Brigitte would be ($T =$) 39 years old. Then they married and lived happily ever after.