Answer on Question # 74065, Physics Mechanics -Relativity:

Question: A spaceship is receding from the earth at a speed of 0.3c. A light on the spaceship emits light of wavelength 4500 Å(angstrom) which appears blue to a passenger on the spaceship. What colour would the light appear to a person on earth?

Solution: We know,

$$\lambda' = \lambda \frac{1+\frac{v}{c}}{\sqrt{1-(\frac{v}{c})^2}} \qquad \text{...........................(1)}$$

Where, λ' = wavelength of light with respect to earth

              λ = wavelength of light with respect to spaceship = 4500 Å

              v = velocity of spaceship = 0.3 C (C = speed of light)

Put the value of λ and v in equation (1), we get,

$$\lambda' = 4500 \times \frac{1+0.3}{\sqrt{1-(0.3)^2}} = 6157.89 \text{ Å (approx.)}$$

This wavelength correspond to orange light.

Answer: Orange colour will appear to a person on the earth.