

Chapter 11.1 Question 1

Exam Q

page 1

(3 marks)

A space probe travels along a line from the Earth to Uranus at a constant speed of $0.95c$ relative to the solar system. Just as it reaches midway between the two planets, it sends laser beams out to the Earth and Uranus at the same time. At what speed do the laser beams approach the Earth and Uranus, respectively?

Speed of laser beam approaching the Earth: _____

Speed of laser beam approaching Uranus: _____

Extended Question

To an observer on Uranus, will the light from the space probe appear red shifted, or blue shifted? Circle the correct answer.

red shifted

blue shifted

Question 2

(4 marks)

Electromagnetic radiation (emr) is said to have both wave and particle properties. State and describe an example of each of these properties of emr.