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*Lecture-Tutorials for Introductory Astronomy*

Homework: Detecting Exoplanets with Gravitational Microlensing

Circle the underlined words or phrases that correctly complete the following sentences.

1. If a massive object passes between Earth and a distant star, the light from the distant star will be / will not be bent by the warped spacetime around the massive object, and as a result, the brightness of the distant star will appear to increase / decrease / stay the same when the massive object passes between Earth and the distant star.

Three graphs are given below. Each graph shows the change in the observed brightness of a distant star caused by a nearby object passing between Earth and the distant star.

1. Rank the mass of the nearby objects, from least to greatest, using the information provided by the three graphs (A-C) above.

1. Graph D, at right, shows how the observed

brightness of a distant star changes when a nearby

exoplanet system, moving from right to left,

crosses between Earth and a distant star. Is the

planet located to the left or to the right of its

parent star? Explain your reasoning.

1. Imagine that the exoplanet was twice as large and twice as far away from its parent star as compared to the information provided in Graph D, but everything else remained the same. In the space below, re-draw Graph D for this new situation.

The figure below shows an exoplanet system, which contains two planets, passing between Earth and a distant star. The exoplanet system is moving in the direction shown by the arrow.

Earth

1. In the space below, sketch a graph of the brightness of the distant star over time, as observed from Earth.