Interference of Waves

- 2 particles cannot occupy the same location.

"Waves CAN! And when they do, they are said to be 'interfering' with each other.

Interference: The result of superposing two or more waves at the same location in medium.

2 waves approach each other.

Crests overlap: Reinforcement

Constrictive interference

Crests & troughs overlap: Cancellation

Destructive interference

After interaction: Waves continue on unaffected!
Looking at Spectra

Old Way
New Way

Continuous

Absorption (Hydrogen)

Emission (Hydrogen)

A Black Hole in the X-Ray Nova Vela X-1

Abstract: We have obtained 1.0 and 2.5 keV spectra of the X-ray source Vela X-1 during four days, with the Rossi X-Ray Timing Explorer. The spectra are characterized by a prominent high-energy peak, which we interpret as being due to Compton scatter of the softer primary X-ray emission. The peak is present in all spectra, with a maximum at 1.0 keV and a tail extending to higher energies. The source is also detected in the 2.5 keV band, with a flux of 1.0 x 10^-12 ergs cm^-2 s^-1. The spectral shape is consistent with a blackbody emission from a hot atmosphere, with a temperature of about 10^6 K. The data are consistent with a black hole model.

X-ray Image

Spectral Energy Distribution