Answer on Question #41576, Physics, Other

Are stationary waves progressive waves? Explain with proof and logics.

Answer

No, ***stationary waves*** are not ***progressive waves***. We can list the most important differences between ***stationary waves*** and ***progressive waves***:

1. In ***stationary waves*** there are points where the displacement is permanently zero (nodes).

   In ***progressive waves*** all particles oscillate about fixed positions.

2. In ***stationary waves*** every point along a $\lambda/4$ has different amplitude of vibration from neighboring points.

   In ***progressive waves*** every particle oscillates with the same amplitude as its neighbors.

3. In ***stationary waves***, all points between nodes are IN PHASE with each other. However, particles within one $\frac{1}{2}\lambda$ are π rad out of phase with the next $\frac{1}{2}\lambda$.

   In ***progressive waves***, each particle within one cycle is out of phase with its neighbors.

4. In ***progressive waves*** energy is transmitted in the direction of travel of the wave.

   In a ***stationary wave***, energy is said to be 'localized'.