

FYI: Coherent and Incoherent Waves

We only observe interference when the sources have a definite (usually constant) phase difference. In this case, the sources are said to be coherent.

Examples of coherent sources:

- Sound waves from speakers driven by electrical signals that have the same frequency and a definite phase.
- Laser light. In a laser, all the atoms emit light with the same frequency and phase. This is a quantum effect that we'll study later in the course.

Laser



The laser light is also all going the same direction.

Incoherent waves: The phase relation is random.

Waves from two unrelated sources.

- Examples: light from two points on the sun or two atoms on a light bulb filament, or two people singing the same note.
- Incoherent intensities add. The average of constructive and destructive interference is no interference!