

Superposition

Physics

What happens when waves meet, and the condition for interference.

Where waves overlap, the resultant displacement is the vector sum of the individual displacements.

Constructive: path difference = $n\lambda$ · Destructive: $(n + \frac{1}{2})\lambda$

Path difference 0

Constructive

Path difference $\lambda/2$

Destructive

Path difference 2λ

Constructive

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✗ **Expecting interference from any two sources**

✓ **They must be coherent**

Coherent means constant phase difference and the same frequency. Otherwise the pattern shifts too fast to observe.

Coherence is why a laser produces a clear interference pattern and two separate lamps do not.