

Frequently asked questions QUANTUM ELECTRONICS
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Module 4: Frequently asked questions:

1. Q: Does four wave mixing always take place when multiple frequencies propagate along an optical fiber?
2. Q: Considering only self phase modulation, what happens to the pulse as it propagates in the fiber?

Answers of module 4 FAQs:

A 1: For efficient four wave mixing, the second order dispersion needs to be zero. This will ensure that the phase velocity of the nonlinear polarization at the new frequency will be equal to the phase velocity of the electromagnetic wave at that frequency. Hence maximum four wave mixing takes place at the zero dispersion wavelength of an optical fiber.

A2: When only self phase modulation is present, then the pulse will get chirped while maintaining its temporal width. Thus since the pulse is chirped without any temporal broadening its bandwidth must be more than the input pulse. The new frequencies are generated from the nonlinear interaction process.