

# Temporal focusing by use of composite X waves

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**ABSTRACT** It is shown that highly focused pulses can be shaped by exciting a finite aperture with a spread-out pulse train of X waves. The basis of the proposed scheme is that the peaks of X waves, characterized by different apex angles, travel at different velocities. This property allows one to vary the temporal starting points of the initial excitations of a sequence of X waves so that all their peaks meet at a chosen focusing point. It is demonstrated that this simple criterion can be effective in producing a highly focused, composite X-wave pulse that exhibits a slower decay behavior than the individual X-wave components used in synthesizing it.

**KEYWORDS** Localized waves; source-free composite X waves; temporal focusing

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