Spatio-temporal characterization of ultrashort laser pulse tightly focused by off-axis parabolic mirror

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Modern laser technologies make it possible to produce ultrashort, powerful laser pulses, which can then be focused into a spot of several wavelengths. To model such laser pulses, the calculations must take into account the spatiotemporal coupling. Here we propose an approach based on Stratton-Chu integrals, which allows the simulation of laser pulses with different spatial profiles, focused into a spot up to the diffraction limit, and extending to a non-monoenergetic laser field. The range of applicability of the monoenergetic model is discussed and the differences between the two approaches are analyzed for those laser parameters where these differences become significant.

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