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Title:Distributed source model for the full-wave electromagnetic simulation of nonlinear terahertz generation
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Abstract:The process of terahertz generation through optical rectification in a nonlinear crystal is modeled using discretized equivalent current sources. The equivalent terahertz sources are distributed in the active volume and computed based on a separately modeled near-infrared pump beam. This approach can be used to define an appropriate excitation for full-wave electromagnetic numerical simulations of the generated terahertz radiation. This enables predictive modeling of the near-field interactions of the terahertz beam with micro-structured samples, e.g. in a near-field timeresolved microscopy system. The distributed source model is described in detail, and an implementation in a particular full-wave simulation tool is presented. The numerical results are then validated through a series of measurements on square apertures. The general principle can be applied to other nonlinear processes with possible implementation in any full-wave numerical electromagnetic solver. © 2012 Optical Society of America.
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