Possibility of carbon-dioxide pumped terahertz sources

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Terahertz generation in nonlinear media is known to be a widely used way to generate single cycle terahertz pulses with great efficiency. Using high pumping intensity in semiconducting materials at the close infrared region is not feasable due to the high multiphoton absorption. `\ref{GYULA}` As of now, carpon-dioxide lasers with sub-picosecond pulse durations are available `\ref{Gyuri kézirat cikk}`, which can eliminate low-order multiphoton absorption since their central wavelength is approximetly 10 μm.

Numeric 1D+1 calculations were ran with pulse durations between 0.5-2.5 ps and intensities from 20- to 100 GW/cm^2. Our mathematical model took account for the optical rectification, cascading up- and downconversion of pump pulse, the self phase modulation of pump pulse **ravi2014limitations** and the second harmonic generated by the pump pulse. The result with 1.5 ps pulse duration and 60 GW/cm^2 pumping intensity is shown on **Fig. 1**.

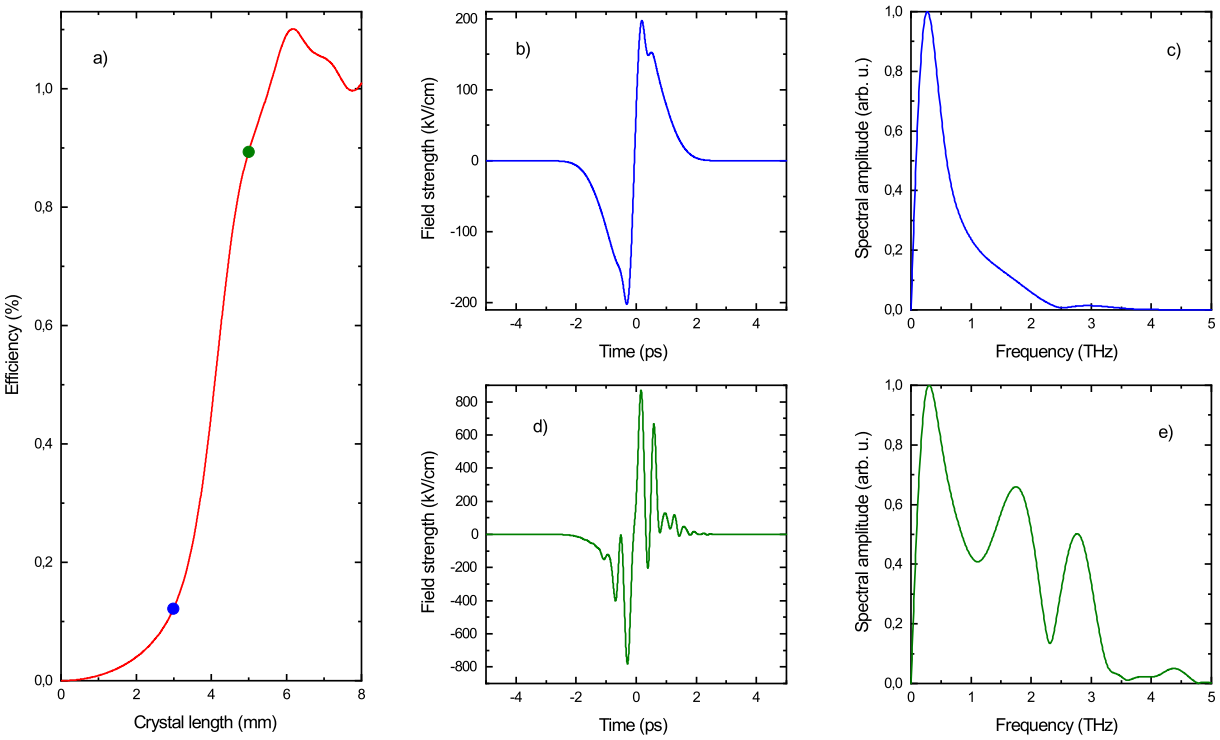

Fig. 1 Results of numeric calculations: a) conversion efficiency,
b)-c) electric field and spectrum at 3 mm, d)-e) electric field and spectrum at 5 mm

The results show that...