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Octave-spanning supercontinuum generation in a silicon-rich nitride waveguide: erratum

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We update the simulations presented in Opt. Lett. 41, 2719 (2016) using a corrected value for the material nonlinearity.

OCIS codes: (130.2790) Guided waves; (130.2755) Glass waveguides; (190.7110) Ultrafast nonlinear optics; (320.6629) Supercontinuum generation.

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In Ref. [1] the simulations presented used the nonlinearity of the silicon-rich nitride waveguide $\gamma = 5.7\ (\mathrm{Wm})^{-1}$, which was calculated from the measurements in Ref. [2]. However, this value was recently estimated to be $\gamma = 3.0\ (\mathrm{Wm})^{-1}$ [3]. Therefore all the reported pulse peak powers and pulse energies in the simulations in Ref. [1] should be a factor $5.7/3.0 = 1.9$ larger. The relevant updated figures are reported below where the simulations have been repeated using the same pulse energies used in the experiment. This results in a better overall agreement between the experiment and the simulations.

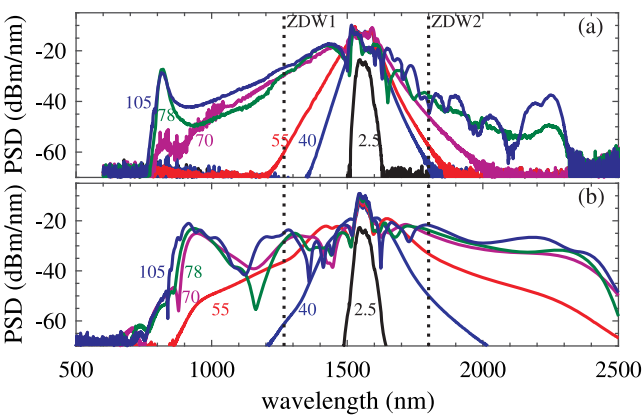

Fig. 2. (a) Experimental spectra in the TE case, showing the PSD at the end of the waveguide (corrected for end-facet coupling loss). The numbers show the estimated input pulse energies in pJ. (b) Results of numerical simulations of the TE FM using $h = 660$ nm. The spectra show the total PSD at the waveguide end averaged over 50 noise realizations. The pulse was prechirped using GDD $= +3500\ \mathrm{fs}^2$.

One specific conclusion was made in connection with Fig. 6, where it was mentioned that around 20 pJ should be sufficient to see a mid-IR supercontinuum in a 750 nm thick waveguide and using transform-limited pulses. The updated value with the revised nonlinear coefficient should accordingly be around 40 pJ.

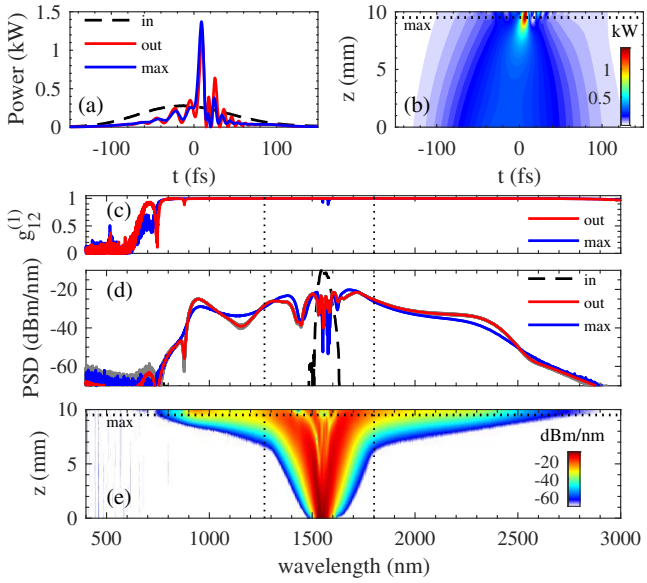

Fig. 4. Numerical simulation of the TE-polarization FM, using 70 pJ total input energy, as in Fig. 2(b). (a) and (b) show time domain and (e) shows wavelength domain dynamics of a single noise realization. The coherence function (c) and FM spectra (d) were averaged over 50 noise realizations (each shown in gray for the output pulse).

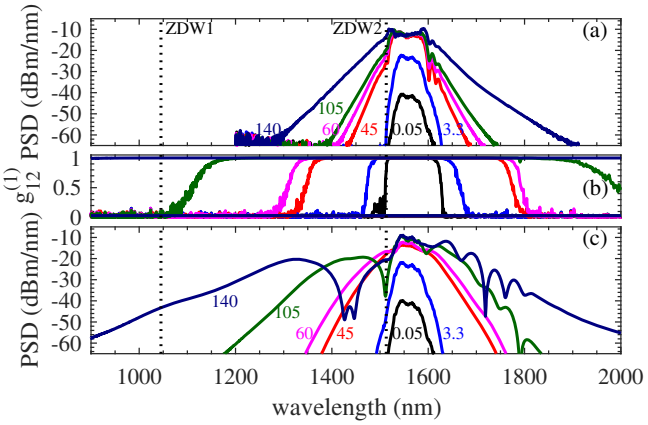

Fig. 5. (a) Experimental spectra for various TM pump pulse energies; the ZDWs are those calculated for a TM-polarization mode using a 660 nm waveguide height. TM mode numerical simulations showing (b) the coherence function and (c) the average spectra. The simulations used the same waveguide specs (width, height) and input pulse prechirp as Fig. 2(b).

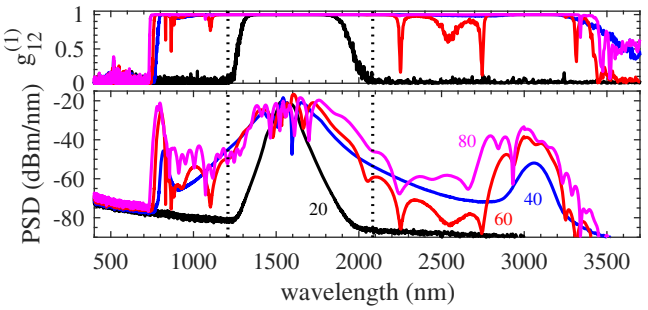

Fig. 6. Simulations showing the spectral coherence and average PSD for a 750 nm waveguide height and using a transform-limited TE polarized pump pulse.

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