# The role of the second zero-dispersion wavelength in generation of supercontinua and bright-bright soliton-pairs across the zero-dispersion wavelength: erratum

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**Abstract:** An erratum is presented explaining that the observation in the original paper of a bright-bright soliton with one color in the anomalous dispersion region and the other color in the normal dispersion region was mistaken; both parts of the soliton-pair were located in regions with anomalous dispersion.



**OCIS codes:** (190.4370) Nonlinear optics, fibers; (190.5530) Pulse propagation and solitons

## References and links

1. M. H. Frosz, P. Falk, and O. Bang, "The role of the second zero-dispersion wavelength in generation of supercontinua and bright-bright soliton-pairs across the zero-dispersion wavelength," Opt. Express **13**(16), 6181–6192 (2005). http://www.opticsexpress.org/abstract.cfm?URI=OPEX-13-16-6181.

In Ref. [1] we described the role of the higher zero-dispersion wavelength (ZDW) when generating a supercontinuum in a photonic crystal fiber (PCF) with two ZDWs. It was, e.g., shown that the higher ZDW limits how far a soliton can red-shift, before transferring energy to a dispersive wave in the normal dispersion region. For one of the investigated PCF designs (pitch $\Lambda = 1.2$ μm, relative air-hole diameter $d/\Lambda = 0.62$) it was found that the energy transferred to $\sim 1650$ nm in the normal dispersion region did not broaden temporally, but instead seemed to form a bright-bright soliton-pair with a co-propagating soliton at $\sim 1270$ nm in the anomalous dispersion region.

We have recently found that there was an error in calculating the dispersion operator used in the split-step Fourier method, even though we used a sufficiently high number of $\beta$-coefficients. For the fiber with $\Lambda = 1.2$ μm and $d/\Lambda = 0.62$ the error corresponded to a change of the dispersion profile, as shown in Fig. 1.

It is seen that the error caused the second ZDW to shift slightly to a higher wavelength, but much more importantly that a third ZDW occurs at about 1600 nm. Therefore there is anomalous dispersion at 1650 nm. This explains why the energy transferred from the soliton at $\sim 1270$ nm to $\sim 1650$ nm does not broaden temporally; it experiences anomalous dispersion

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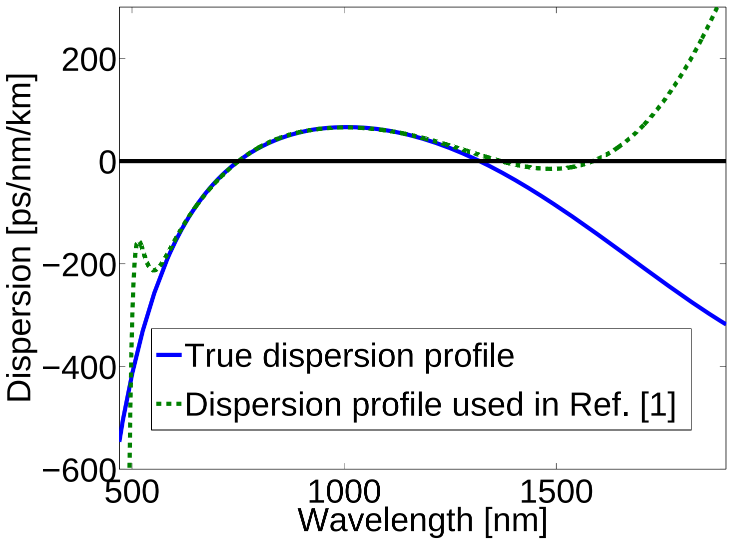


Fig. 1. Dispersion profile for PCF with structural parameters $\Lambda = 1.2$ μm and $d/\Lambda = 0.62$ (blue) and the dispersion profile incorrectly used in Ref. [1] (green, dashed).

and can therefore form a soliton. Both components of the temporally overlapping bright-bright soliton pair are thus experiencing anomalous dispersion, but are separated spectrally by a small region of normal dispersion.

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