

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Pulse Shaping with Moire Volume Bragg Gratings SERGIY MOKHOV, DANIEL OTT, BORIS ZELDOVICH, LEONID GLEBOV, CREOL - the College of Optics and Photonics, Univ. of Central Florida — Optical pulses of various temporal profiles are required for many applications but their durations and shapes are available only in limited ranges for certain laser wavelengths. For generation of pulse durations around ten ps, we proposed to reflect short pulses from volume Bragg gratings (VBGs) with few millimeter thickness. In case of VBG reflection bandwidth much narrower than incident pulse spectral width the significant loss of power occurs but such approach can be acceptable if there are no other generation processes for required pulse duration. VBGs in photo-thermo-refractive glass developed in our group are characterized by wide transparency range, small absorption and high laser damage threshold. In comparison with fiber Bragg gratings VBGs have additional spatial transverse degrees of freedom which allow not only tuning the pulse carrier wavelength but also shaping of generated pulses. Recording of two gratings with slightly different periods in the same glass wafer provides VBG with moire fringe pattern. After skew cutting of specimen with thickness of moire semi-period the longitudinal modulation VBG profile will vary in transverse direction from sine semi-period to cosine one. Reflected pulse from VBG with apodized sine profile has temporal profile close to transform limited Gaussian one while pulse reflected from transverse part of moire VBG with cosine semi-period profile has zero dip in temporal profile. At intermediate position the flat-top pulse shape is achievable.

Sergiy Mokhov
CREOL - the College of Optics and Photonics, Univ. of Central Florida

Date submitted: 18 Nov 2012

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