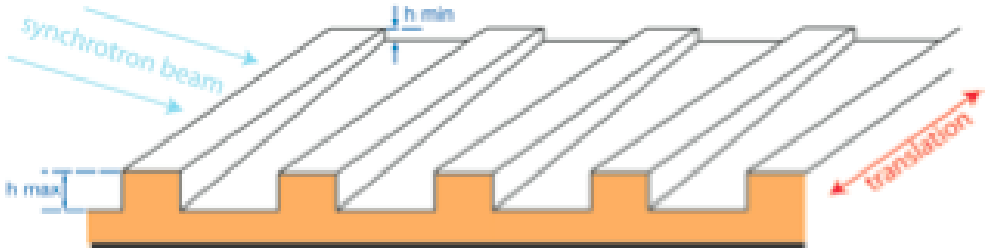
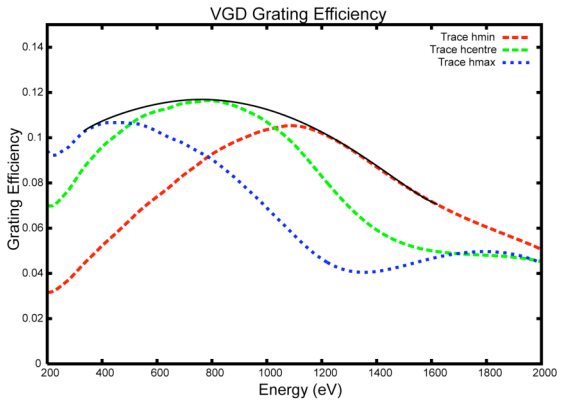
NEW TUNABLE BLAZE DIFFRACTION GRATINGS FOR EUV APPLICATIONS

Bruno Touzet, Didier Lepère, Julien Serre, Audrey Liard-Cloup, Laurent Marchetti
HORIBA JOBIN YVON SAS, 16-18 rue du canal, 91165 Longjumeau, FRANCE

This new type of diffraction grating, called VGD Grating (VGD for Variable Groove Depth), is produced in such a way that the Groove Profile Depth is continuously variable from one side to the other side of the grating. As the blaze efficiency depends directly of the groove profile depth, the VGD grating gives the unique opportunity to get a much wider spectral range thanks to a simple grating translation along its width.



When such blaze adjustment is combined with monochromator scanning movements and narrow beam, the VGD offers to perform ON BLAZE scan and/or to minimise harmonics contamination over wide spectral range.



One Single VGD grating provides efficiency properties of several classical gratings.

Jobin Yvon VGD grating technology is compatible with:

- ✓ Silicon and Fused Silica high polished blanks
- ✓ Holographic Recording Process
- ✓ Constant, Aberration Corrected, VLS groove distribution
- ✓ Ion Etching Process
- ✓ XUV Reflective Coatings

The VGD grating technology, developed as a collaboration with Soleil Synchrotron teams, is usable with most of the recent synchrotron beamline designs that provide mm size synchrotron beam onto the grating. Replacing classical or multi track gratings by a VGD grating will open new experimental opportunities with optimised flux performances over the whole beamline spectral range.

Most of Soleil's extreme-UV monochromators have been designed to take advantage of the VGD potential (for example, the TEMPO,CASSIOPEE and PLEIADES beamlines).

Example of VGD Gratings

blank size	useful arera	grooves density	Nominal depth variation over 25 mm		
(mm)	(mm)	(/mm)	h min (nm)	h centre (nm)	h max (nm)
40x100x30	35x90	1800	4.5	10	15.5
40x100x30	35x90	600	18	35	52
40x100x30	35x90	300	42.5	80	117.5

References

[1] F.Polack, B.Lagarde, M.Idir, A.Liard-Cloup, E.Jourdain, "Variable Groove Depth Gratings and their Applications in Soft X-ray Monochromators" *AIP Conference Proceedings 879*, International Conference on Synchrotron Radiation Instrumentation, Korea (2007)

Bruno Touzet E-mail : bruno.touzet@jobinyvon.fr