



1. Title:	Evaluation of magnetron sputter deposition as multilayer coating technology for EUVL projection optics
2. Full names of all authors:	Stefan Braun (1), Thomas Foltyn (1), Peter Kürz (2), Andreas Leson (1), Maik Menzel (1), Stephan Müllender (2), Stefan Schädlich (1), Thomas Westerwalbesloh (2)

3. Abstract body:

It has been shown by many groups that with magnetron sputter deposition (MSD) Mo/Si multilayers having high EUV reflectances of around 70 % can be produced. Advantageously the coating time for a 50-period multilayer is only in the order of 1 hour. Despite these two positive aspects of MSD, several questions remained open in the past concerning the suitability for the coating of EUVL projection optics in a production environment. We will summarize the current status of MSD used in IWS Dresden concerning EUV reflectance, precision of layer thickness distributions, internal stress and process reproducibility.

As a possible drawback of MSD it is accepted that compared to e-beam evaporated multilayers the internal stress of high-reflection multilayers is typically two times higher (around -400 MPa for MSD and -200 MPa for e-beam deposition). We will show that high-reflection multilayers ($R > 69.5\%$) with internal stress of approx. -220 MPa can also be produced by MSD.

Furthermore we do not use in-situ control of the layer thickness. Therefore the run-to-run reproducibility of the deposition process has to be extremely high in order to ensure the correct l-matching. If all influences on the layer thicknesses are considered, l-matchings $> 99.9\%$ can be obtained.