

Finalize Documentation - Diffractive Optical Elements

For this project, I tried to create a Diffractive Optical Element (DOE) that refracts incoming laser to project an image. The following is my steps of creating the device and values that optimizes the final product.

1. Acquire image/ logo
2. Turn image/ logo into black and white.
3. Make the logo approximately 1/9 of the image size and centered
4. It would look something like (fig. 1)
5. Set the image size in pixels equivalent to the actual physical size in micrometers (for example if you want the mask to be 4mm x 4mm, which is 4000 micrometer x 4000 micrometer then the pixel size should be 4000 x 4000)
6. Then go to the following link and download the software that transforms the image into a phase mask.
 - a. GDOESII: Software for design of diffractive optical elements and phase mask conversion to GDSII lithography files
<https://www.sciencedirect.com/science/article/pii/S2352711018302711#bb3>
7. Read the study and understand more about phase masks and the software
8. Use DOE mode of the software and upload the image that was created
9. Fill in the parameters and try different Fresnel values (I start with 100mm then decrease it until I see a clear image of the mask)
10. It would look something like (fig. 2)
11. Follow the following guide written by Nanoguide to set up the print
 - a. Diffractive Optical Elements (DOE) and Image Printing
<https://support.nanoscribe.com/hc/en-gb/articles/360000530993-Diffractive-Optical-Elements-DOE-and-Image-Printing#Ch:DOE:Creation>
12. Some values I used that could help reduce print time: level count 8, design height 1 and other values should auto-adjust.

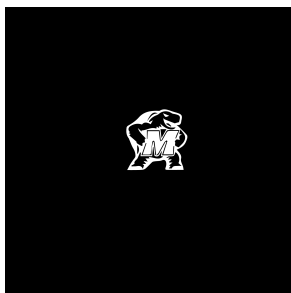


Fig. 1

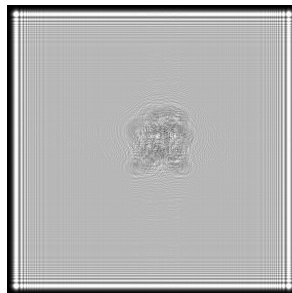


Fig. 2