Diffraction Efficiency Analysis for a Czerny-Turner Setup
Czerny-Turner setup is widely used to analyze the spectral information of light sources. Typically, a parabolic mirror is used to collimated the source first, and then a diffraction grating will spatially separate the colors spatially. A simulation of the complete setup, including real reflective mirrors and diffractive gratings is presented. Especially, the diffraction efficiency of the grating calculated with Fourier modal method (FMM), and the corresponding result on the detector plane is shown.
Modeling Task

- Input spectrum:
  - Wavelengths: 463, 496, 535 nm with equal weights
  - Linearly polarized

- Parabolic mirror 1:
  - Focal length: 100 mm

- Parabolic mirror 2:
  - Focal length: 100 mm

- Sawtooth grating:
  - Period: 833 nm
  - Modulation depth: 282 nm

Output spectrum?

With rigorous consideration of diffraction efficiency of the grating.
Results

wavelengths 463, 496, 535 nm, with equal weights

Simulation of full system including rigorous grating simulation takes only 3 seconds.
## Document Information

<table>
<thead>
<tr>
<th>title</th>
<th>Diffraction Efficiency Analysis for a Czerny-Turner Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>version</td>
<td>1.0</td>
</tr>
<tr>
<td>VL version used for simulations</td>
<td>7.0.3.4</td>
</tr>
<tr>
<td>category</td>
<td>Application Use Case</td>
</tr>
</tbody>
</table>