

# Diffusers for light source

DarkSide production meeting  
14/10-2022

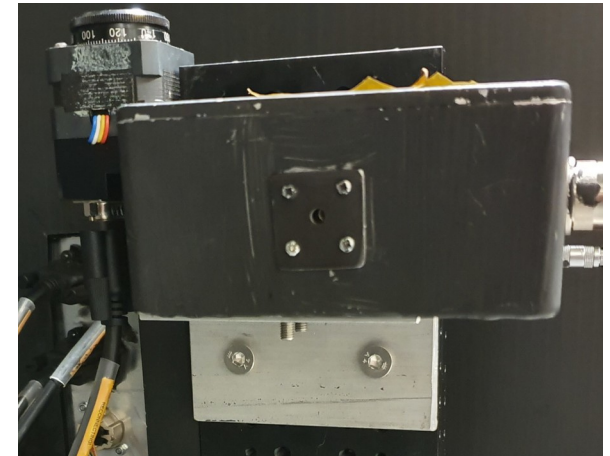
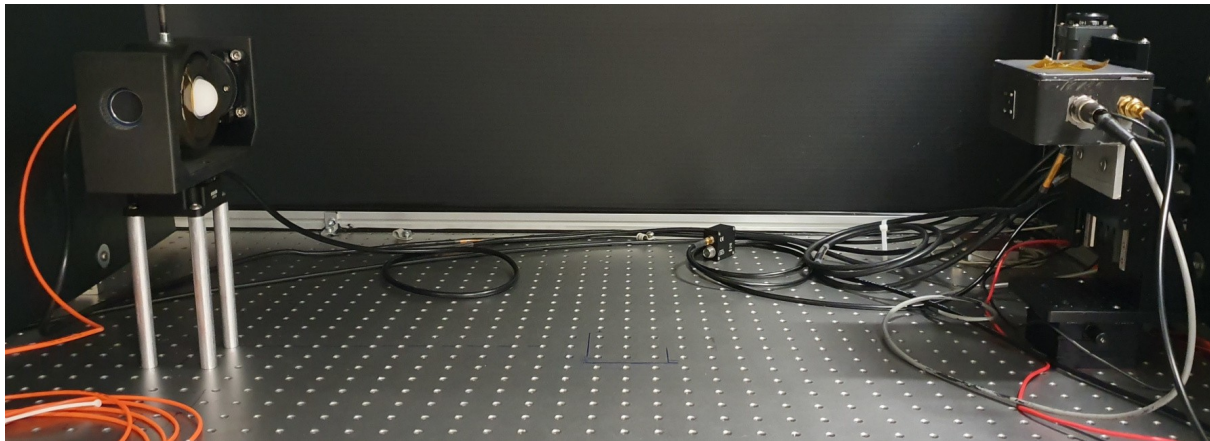
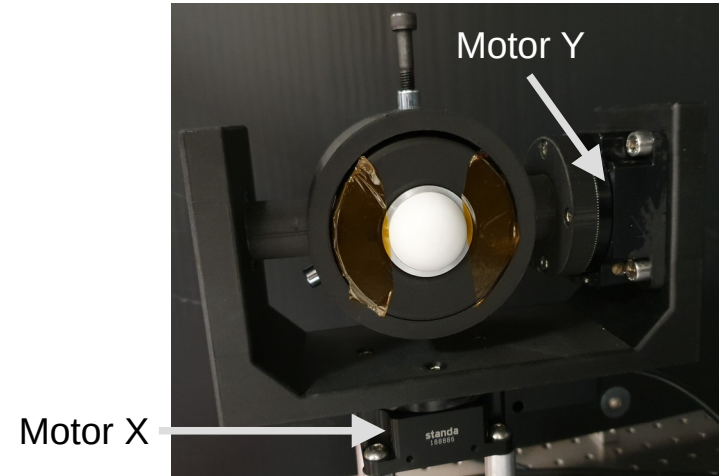
Martin Spangenberg  
University of Warwick



# Setup

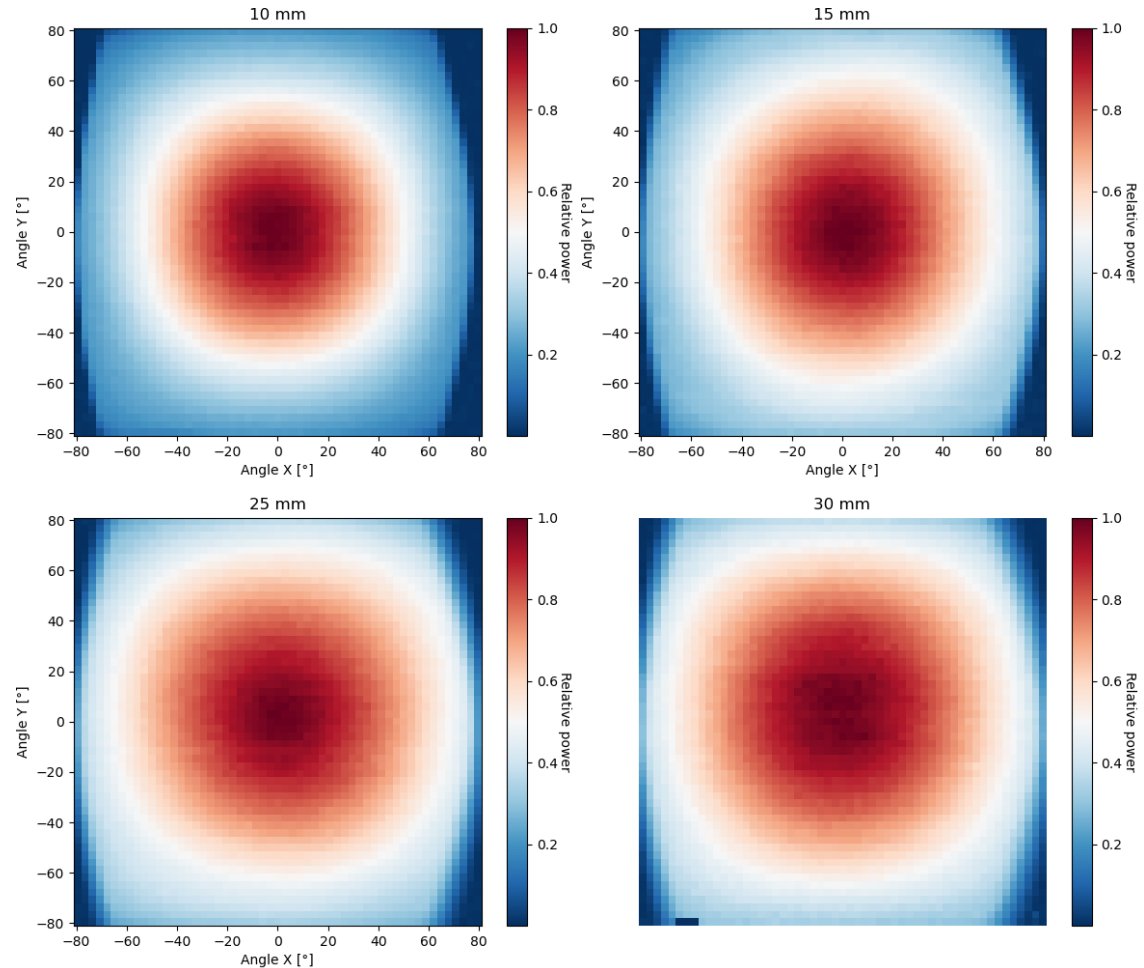
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- Four hemispherical PTFE diffusers produced with diameters 10, 15, 25, 30 mm
- Thorlabs NPL45C pulsed laser sends pulses into back of diffuser using fibre
- Light output measured with PMT at ~80 cm distance
- Diffuser placed in dual rotation stage to obtain spherical light intensity map



# 2D heat maps

- Plots show laser power as a function of the angle in the horizontal (X) and vertical (Y) planes
- Normalised to output at the centre of each diffuser
- Laser power highest at [0,0] and decreases as we move away from the centre
- Larger diffuser diameter results in a wider central “hot spot”



# 1D profile

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- Profile plot of angle  $X = 0^\circ$
- Overall attenuation increases with diffuser diameter
- Central plateau / hotspot seen to increase with diameter
- For angles  $> \sim 20^\circ$ , all diffusers exhibit linear power decrease as a function of angle
- Assuming diffuser placement as shown, useful angles are around  $30^\circ$  to  $45^\circ$ 
  - Diffuser diameter of 15 mm or above gives same intensity slope

