

# Particle velocity measurement within a free-falling particle curtain using microscopic shadow velocimetry

#### Introduction

There is still an ongoing need of high-fidelity experimental data of particle-laden flows to understand the complex interactions between fluid and particles, particularly in solar thermal receivers using high-loading, low-cost particles to capture and store concentrated solar radiation.

## Aim

This project aims to develop the microscopic shadow velocimetry (µ-PSV) technique to measure the particle velocities within free-falling particle curtain, particularly focusing on the development of an image process method to achieve spatial resolution along the curtain thickness.

## **Experimental Setup**

- Dual-pulsed LED with a time delay of  $33 \,\mu s$ .
- $\pm 0.5$  mm depth-of-field of the microscopic lens.
- $2048 \times 2048$  pixels spatial resolution of the camera.



## Image Process Method







adelaide.edu.au

Shipu Han, Zhiwei Sun, Zhao Feng Tian, Timothy Lau, Graham J. Nathan

Zoom link: <a href="https://adelaide.zoom.us/j/6750633813?pwd=YWFoNXRGc200UWhmVGovQWhhYUtxQT09">https://adelaide.zoom.us/j/6750633813?pwd=YWFoNXRGc200UWhmVGovQWhhYUtxQT09</a> Passcode: 486212

Key Results