

HDR WITH RASPBERRY PI

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Motivation

- **Why?**

- combine low dynamic range (LDR) images into an high dynamic range (HDR) image where very dark and very bright regions in a scene can be seen with clarity and high resolution

- **How?**

- building a cheap and easy hardware setup
- capture images
- optional: perform some image processing, e.g. denoising, deblurring, ...

- **HDR applications?**

- medical applications
- digital cinema
- security: entrances to buildings
- computer games
- design applications

Introduction

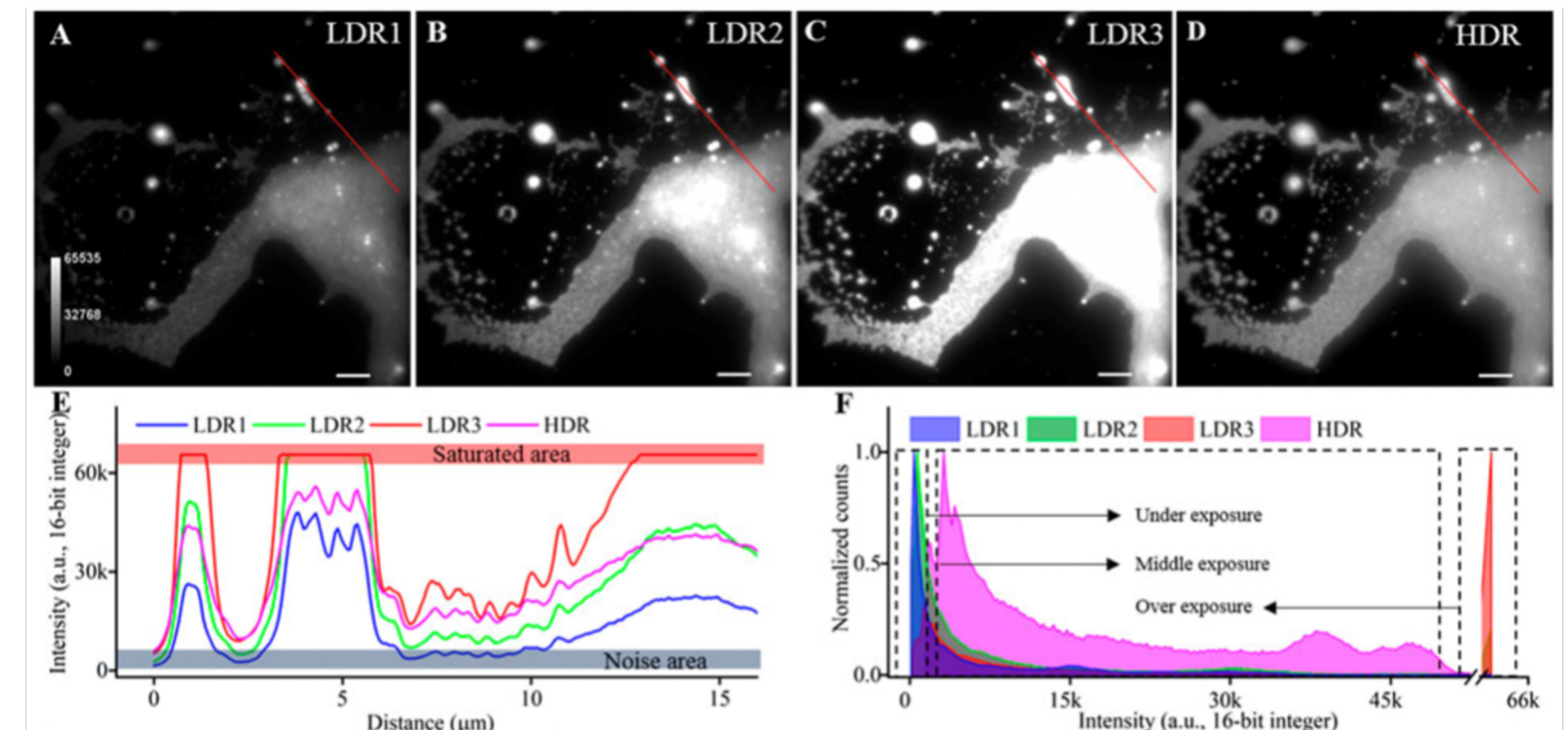
Liang et al, Front. Phys. 9, 648174 (2021)

- **Dynamic Range**

- it is the ratio between the maximum and minimum measurable light intensities (white and black)

- **HDR**

- imaging technique to increase the dynamic range
- by capturing multiple images (of the same scene) but with different exposures and then combining them into one image.



HDR with Raspberry pi

- **Aim of project**

- increase dynamic range of microscopic images taken with a raspberry pi camera

- **Setup**

- simple microscope (just an achromatic lens could be sufficient)
- raspberry pi camera

- **Tasks**

- capture images with different exposures
 - in case you want to fast-forward the project and have a set of input images to test: <https://www.pauldebevec.com/Research/HDR/>
- two options: either change intensity of light or camera shutter speed
- use python or matlab to combine the raw images into an HDR
 - others: command line tools, e.g. pfstools, LuminanceHDR



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Thank You!

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