**GOAL**

Acquire a high dynamic range (HDR) image using a conventional low dynamic range camera with a single exposure.

**PROBLEM**

Conventional cameras are unable to accurately capture the levels of contrast that humans can see in a real world scene.

- Saturation
- Moving Scenes

**METHOD**

Optically blur the scene to decrease its dynamic range for capture, and then invert the blur in software to get the original scene.

1) Defocus camera to blur scene
2) Deconvolve to invert blur

1) **DEFOCUS THE CAMERA**

- Blurs the scene
- Decreases dynamic range
- Optically convolves scene with aperture function

2) **DECONVOLVE**

- Blurring = Convolution
  ⇒ so, deconvolve to invert blur

\[
\text{blurred} = \text{scene} \ast \text{PSF}
\]

- Insert semi-transparent filter into aperture plane to preserve frequencies

- Estimate point spread function (PSF)
- Result has increased dynamic range