



# Flys Eye Arrays for Uniform Illumination

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Published On: April 14, 2006



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# OUTLINE

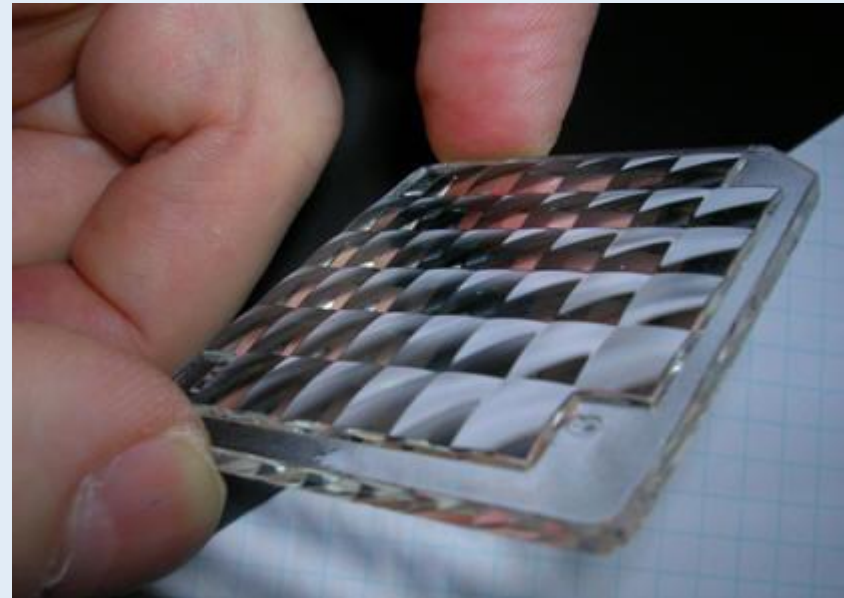
- Introduction
- What Is A Fly's Eye Array?
- How Do They Work?
- Conclusions
- References

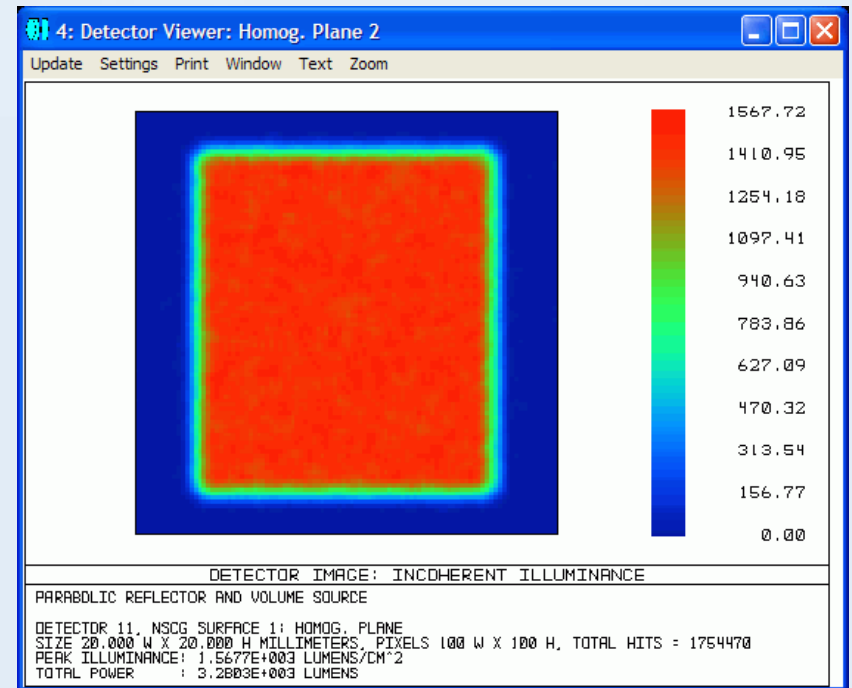
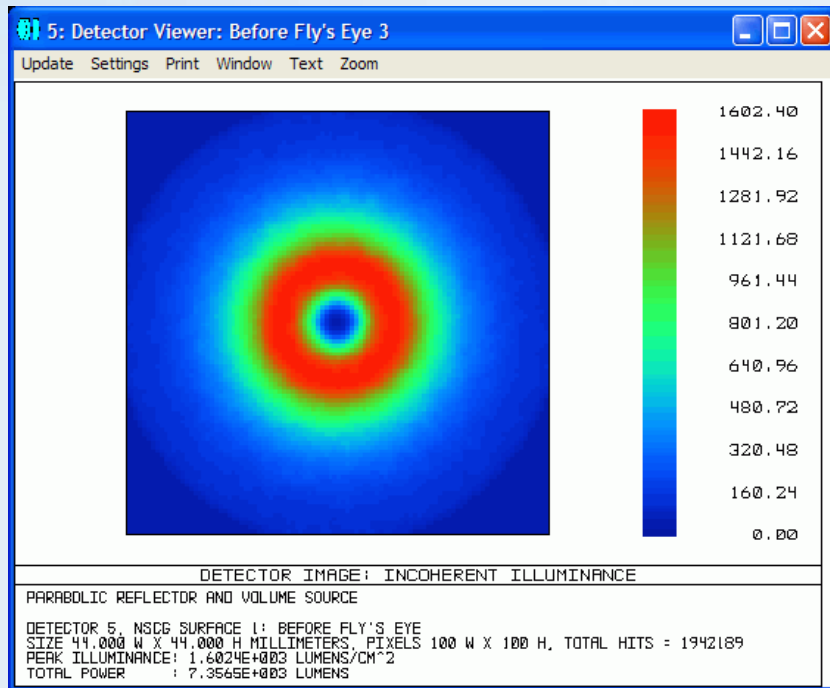
# Introduction

- In digital projector design, when we want to display a still or video image where the digital source is uniform in radiance, we want the corresponding projected image to be uniform in irradiance on the screen.
- In order to achieve this uniformity of irradiance of the projected image we need to have the spatial light modulator, such as an LCD panel, uniformly illuminated.

# What Is A Fly's Eye Array?

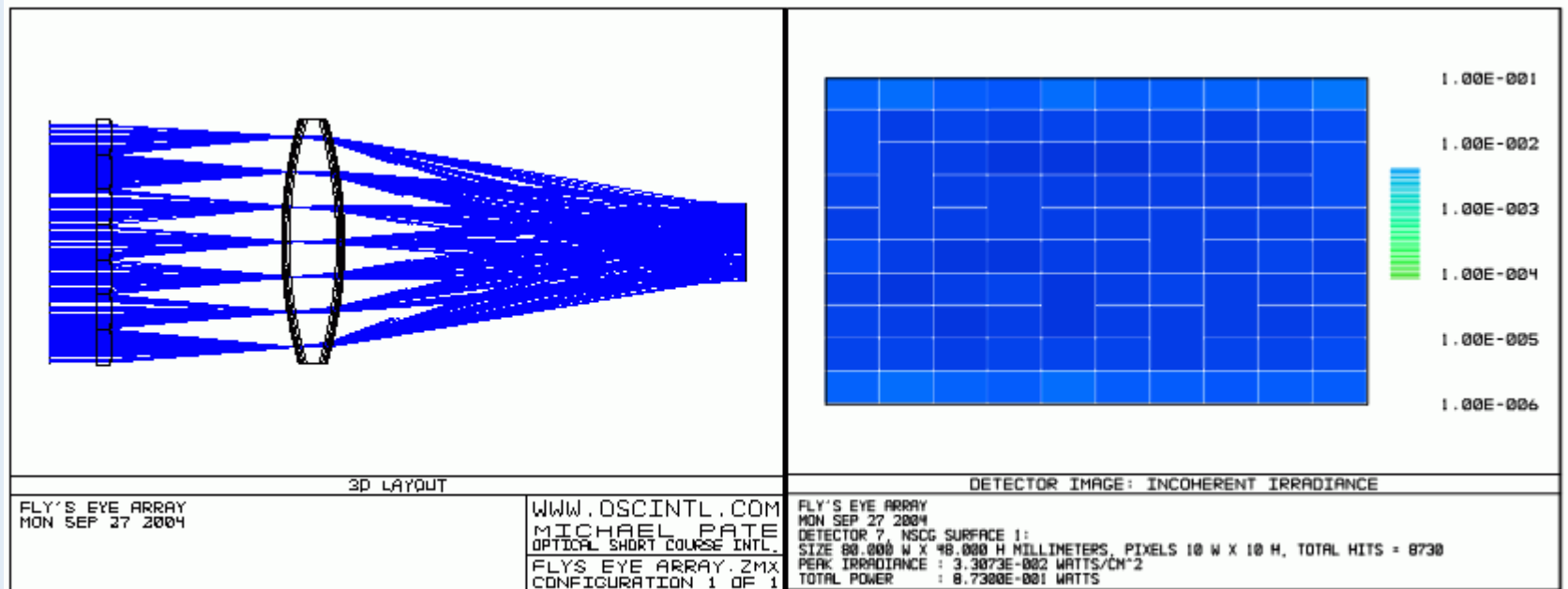
- A fly's eye array is a two dimensional array of individual optical elements assembled or formed into a single optical element and used to spatially transform light from a nonuniform distribution to a uniform irradiance distribution at an illumination plane.



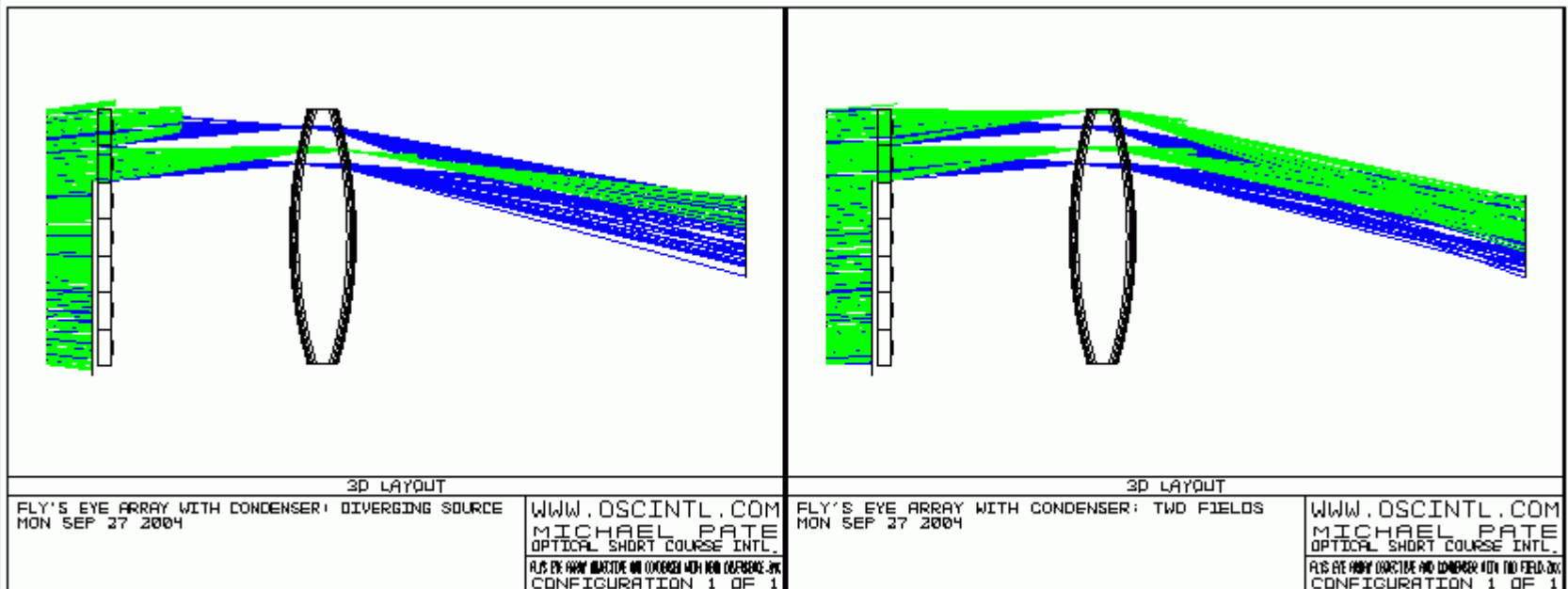


# How Do They Work?

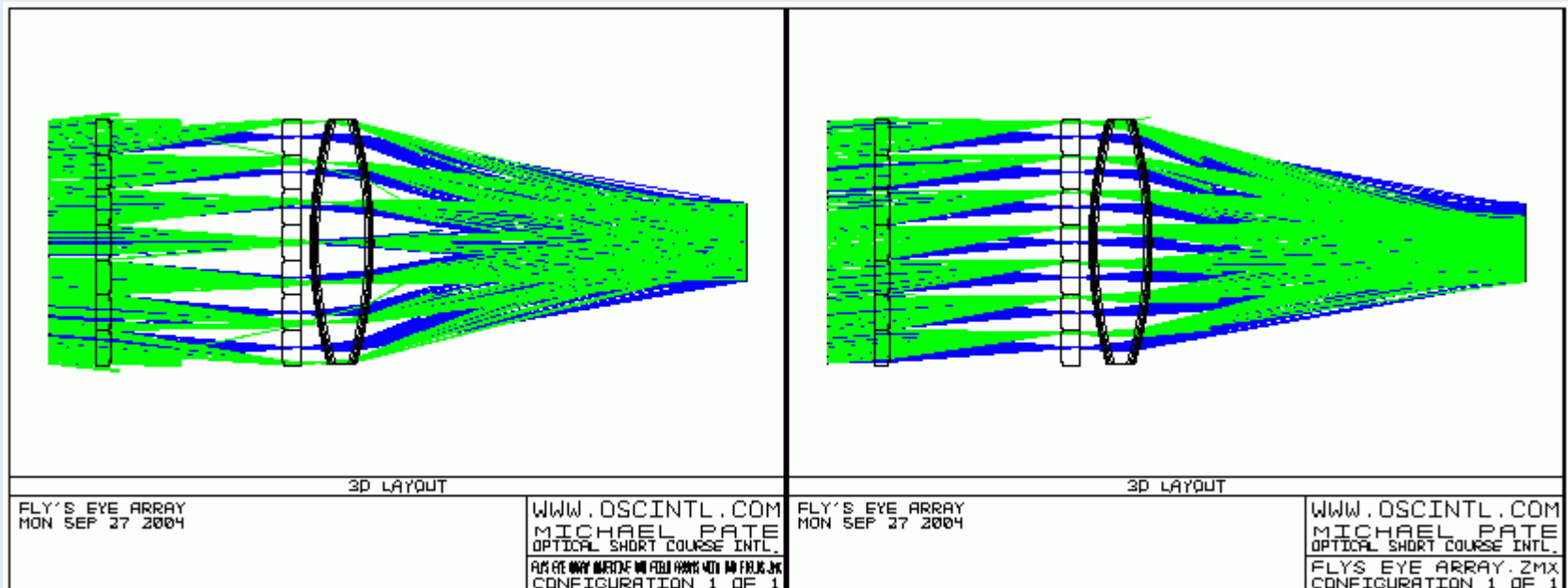
- Fly's eye arrays are typically used in pairs along with a condenser lens to provide uniform irradiance at the illumination plane.



- If an objective array is used with collimated light and we place a condenser lens at the focal plane of the objective array as shown above, we will obtain a uniform irradiance at the illumination plane



- The diverging rays
- the images from all fields are not overlapped at the illumination plane





# Conclusions

- Fly's Eye Array Design Tradeoffs
  - How many channels to have in the vertical and horizontal directions in the array.
  - The larger the number of channels the more uniform the illumination at the illumination plane.
  - The more lenslets, the worse this scattering becomes.
  - Odd or even number of channels is another choice.

# References

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  - Optical MEMS and Nanophotonics 2013, Kanazawa, Japan, 18-22 August 2013
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  - Chih-chieh Chang; Yu-cheng Yang; Ming-chun Su; Jui-che Tsai Optical MEMS and Nanophotonics (OMN), 2014 International Conference on Year: 2014

**Thank you for  
listening**

