# Hot Forming of Curved Mirrors Without the Need for a Mandrel

Tech ID: 33028 / UC Case 2022-840-0

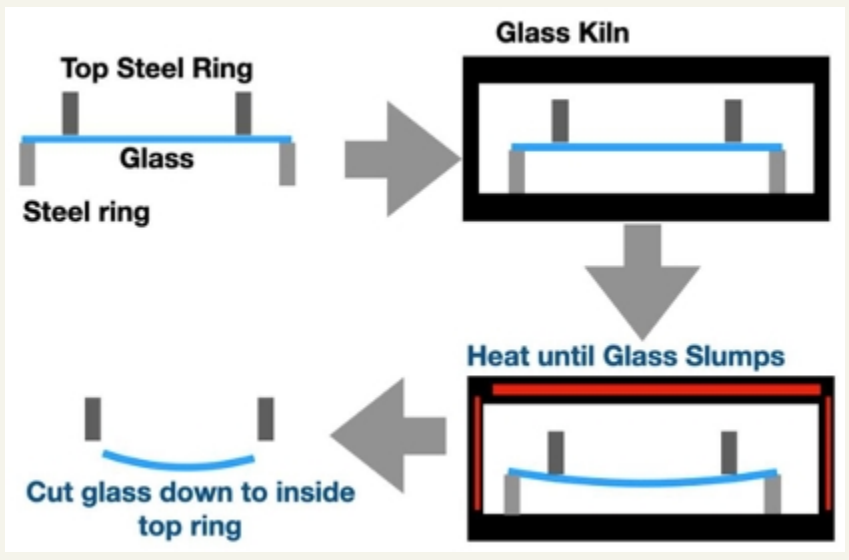
## BACKGROUND

Large format active or deformable mirrors can enable optical applications that are difficult to achieve with more conventional-sized deformable mirrors. In particular, adaptive secondary mirrors (ASMs) can be integrated into telescopes and provide adaptive optics corrections. However, making facesheets for ASMs is challenging. Current facesheet fabrication processes are costly and risky. Hot forming approaches for forming curved facesheets have been developed, but these methods typically require a mold for the facesheet to slump into.

## TECHNOLOGY DESCRIPTION

Researchers at UC Santa Cruz have developed approaches for fabricating facesheets that also use a hot thermal forming process, or slumping. However, instead of using a mold, this approach involves placing a flat facesheet on a support structure, such as a steel ring, thus allowing the facesheet to freeform slump. A weight, such as a second steel ring, is placed on top of the facesheet, aiding the facesheet in forming the desired shape. Once the facesheet has the desired properties, the excess facesheet material between the top weight and the support structure is cut off.

This approach allows for creation of shells of a variety of radii of curvature and eliminates the need for a mold. Furthermore, this approach is an iterative one that allows for adjustments for aberrations produced by previous cycles.




## APPLICATIONS

- optics
- imaging

## ADVANTAGES

- iterative approach allows for correction of optical errors
- eliminates need for negative form for facesheet to slump into
- allows creation of shells of a variety of radii of curvature
- adaptable for different optical prescriptions
- cost efficient

## CONTACT

Jeff M. Jackson
jjackso6@ucsc.edu
tel: .




## INVENTORS

- Hinz, Philip
- Radovan, Matthew

## OTHER INFORMATION

### KEYWORDS

adaptive optics, deformable mirrors, secondary mirror, adaptive secondary mirror, slumping, telescope, facesheet, hybrid variable reluctance actuator, imaging, solar, astronomy, energy concentration

### CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Energy**
  - Solar
- **Imaging**
  - Other

### RELATED CASES

2022-840-0

## INTELLECTUAL PROPERTY INFORMATION

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| United States Of America | Published Application | 20240018030 | 01/18/2024 | 2022-840 |

Additional Patents Pending

## RELATED MATERIALS

- Generating curved deformable facesheets via free form slumping - 08/29/2022

**University of California, Santa Cruz**
**Industry Alliances & Technology Commercialization**
Kerr 413 / IATC,
Santa Cruz,CA 95064

Tel: 831.459.5415
innovation@ucsc.edu
https://officeofresearch.ucsc.edu/
Fax: 831.459.1658

© 2023 - 2024, The Regents of the University of California
Terms of use
Privacy Notice