

# Automotive Lighting Design by Brandenburg GmbH

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brandenburg gmbh  
[www.brandenburg-gmbh.de](http://www.brandenburg-gmbh.de)

# The Brandenburg GmbH

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- **Started in 1998**
- **12 employee**
- **Business fields:**
  - **Software sales**
  - **Lighting consulting & design**
- **Software products**
  - **LucidShape**
  - **LucidFunGeo**
  - **LucidLite**
  - **LucidDrive**
- **Worldwide customer**
  - **Car maker: i.e. Volkswagen group**
  - **Lamp maker: Philips, Osram**
  - **Tier 1: Europe, USA, Canada**

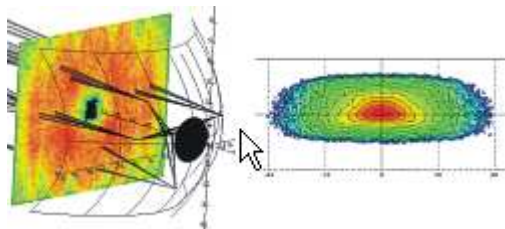
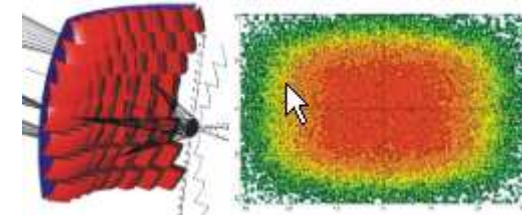
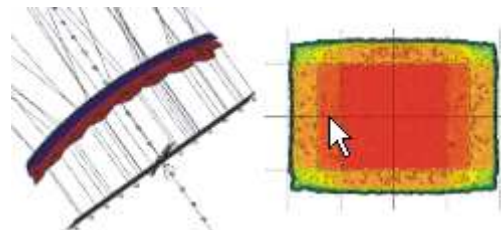
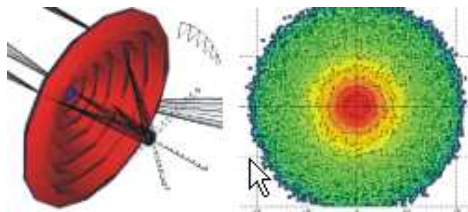
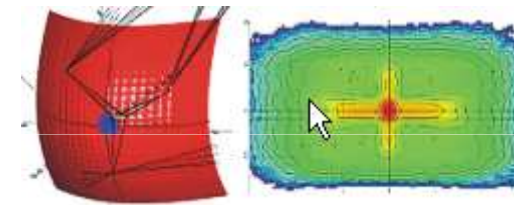
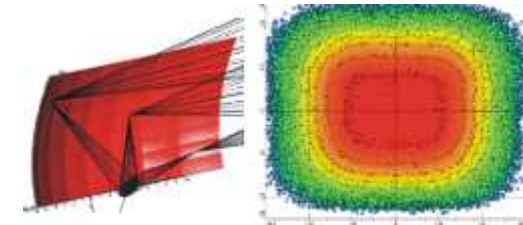
# Experience

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- **W. Brandenburg**
  - **17 years at Hella**
  - **Head of software department (Helios)**
  - **Head of lighting laboratory**
- **Kirk Anderson, Lighting Engineer**
  - **US companies: Hella, Meridian, ACH**
- **Dr. Andreas Bielawny, Lighting Engineer**
  - **Phd. in Optic and Lighting**

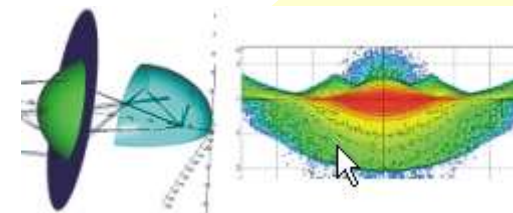
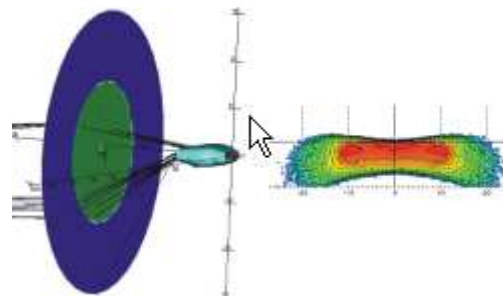
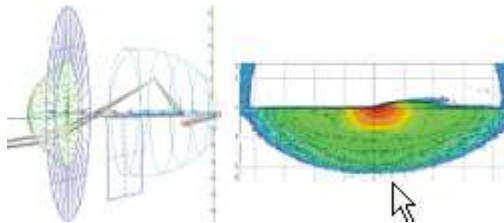
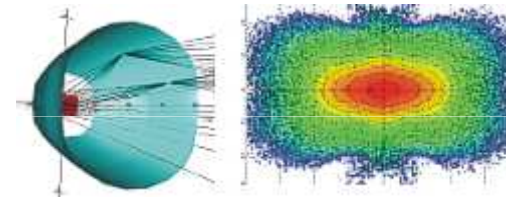
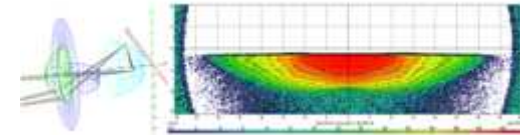
# Procedural Surfaces Applications

- Created by procedure:
  - sweep, rotation, extrusion of curves
- Easy to use
- Signal lamps, interior, headlamps



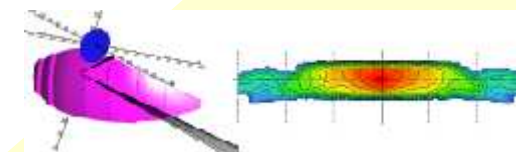
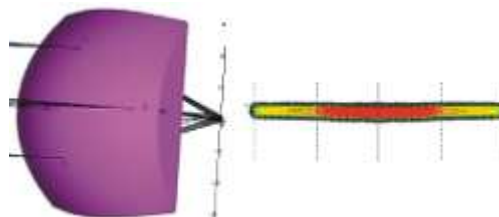
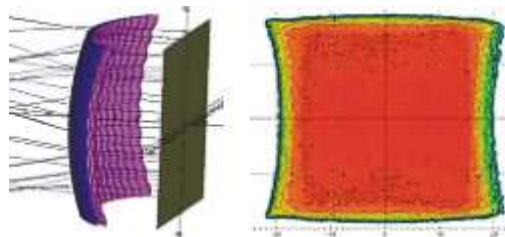
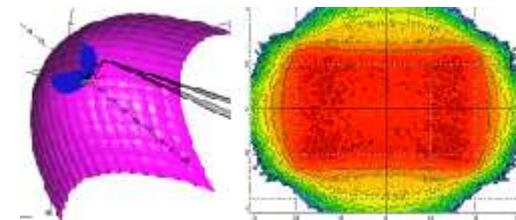
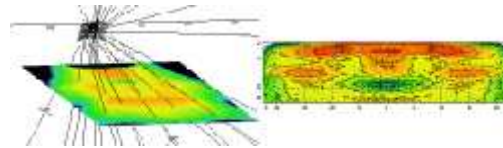
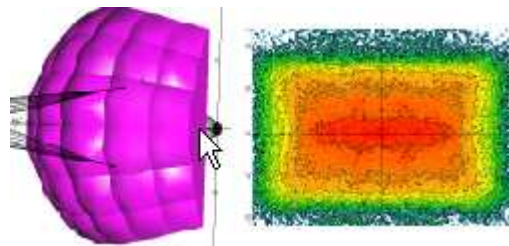
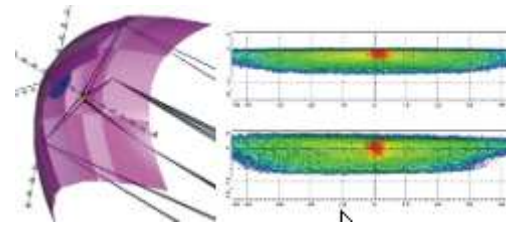
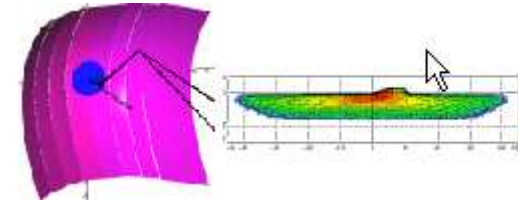
# Poly Curve System Applications

- Special Skinned type Surface
- Created over Curve skeleton
- Application:
  - PES headlamps
  - LED concentrators



# Macro Focal Applications

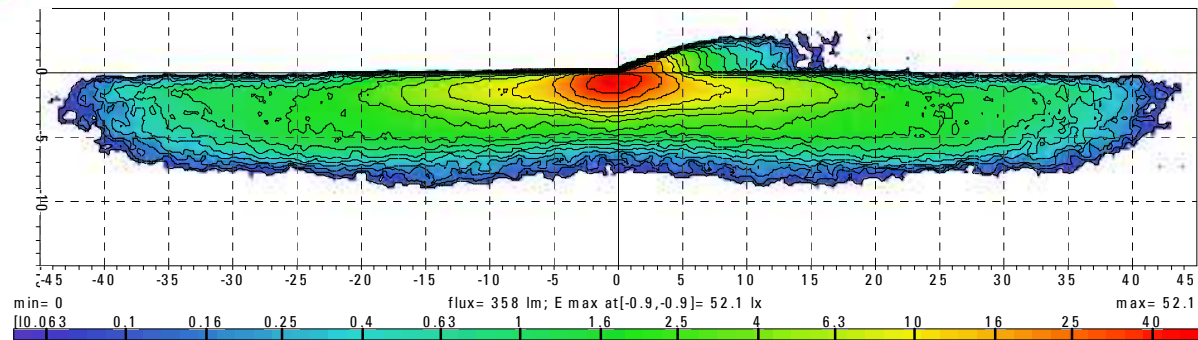
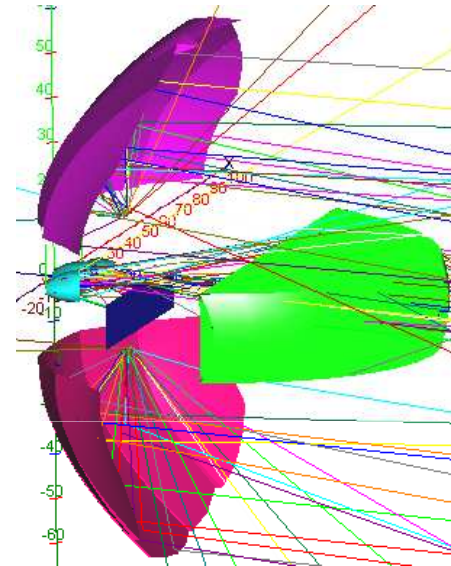
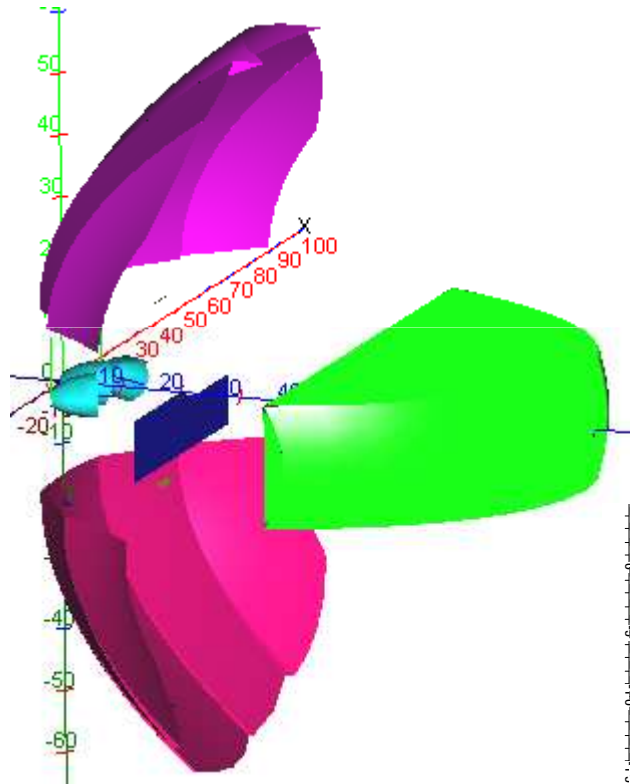
- Design of cutoff line & other pattern
- Flexible in spread definition
- Define reflector layout
- Use predefined base grids
  - Includes Styling issues



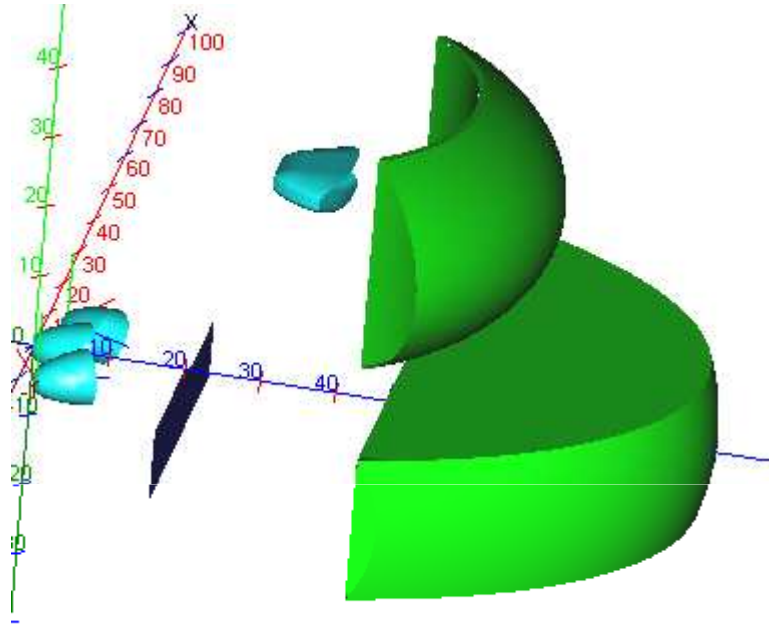
# LED multi module headlamp

- Hot spot by 3 PES units
- Wide Spread by 2 half reflectors

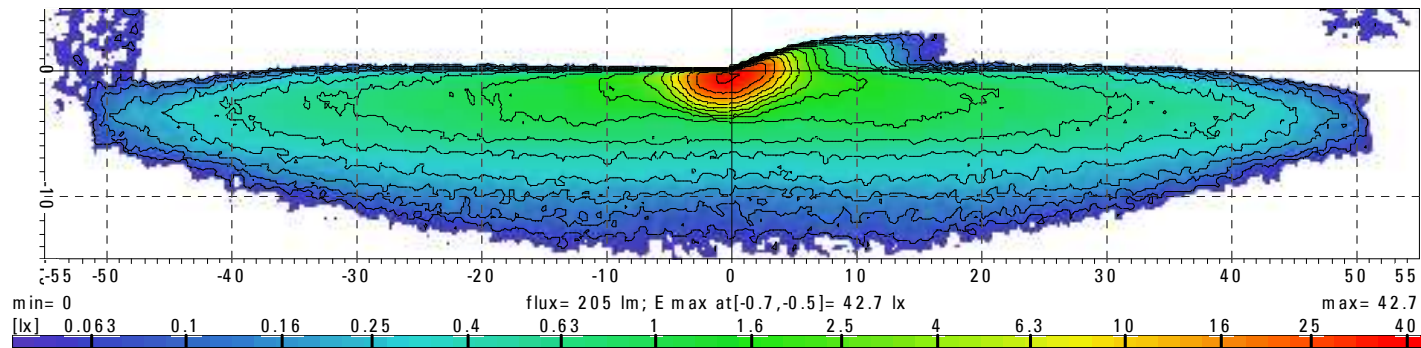
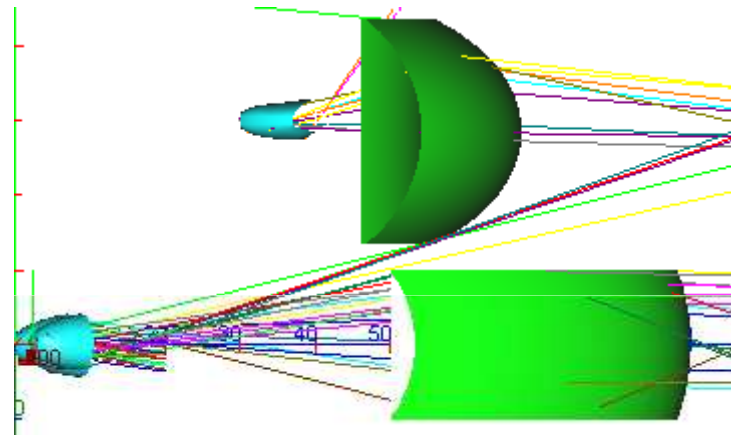
- Various LED sources



# LED multi module headlamp II

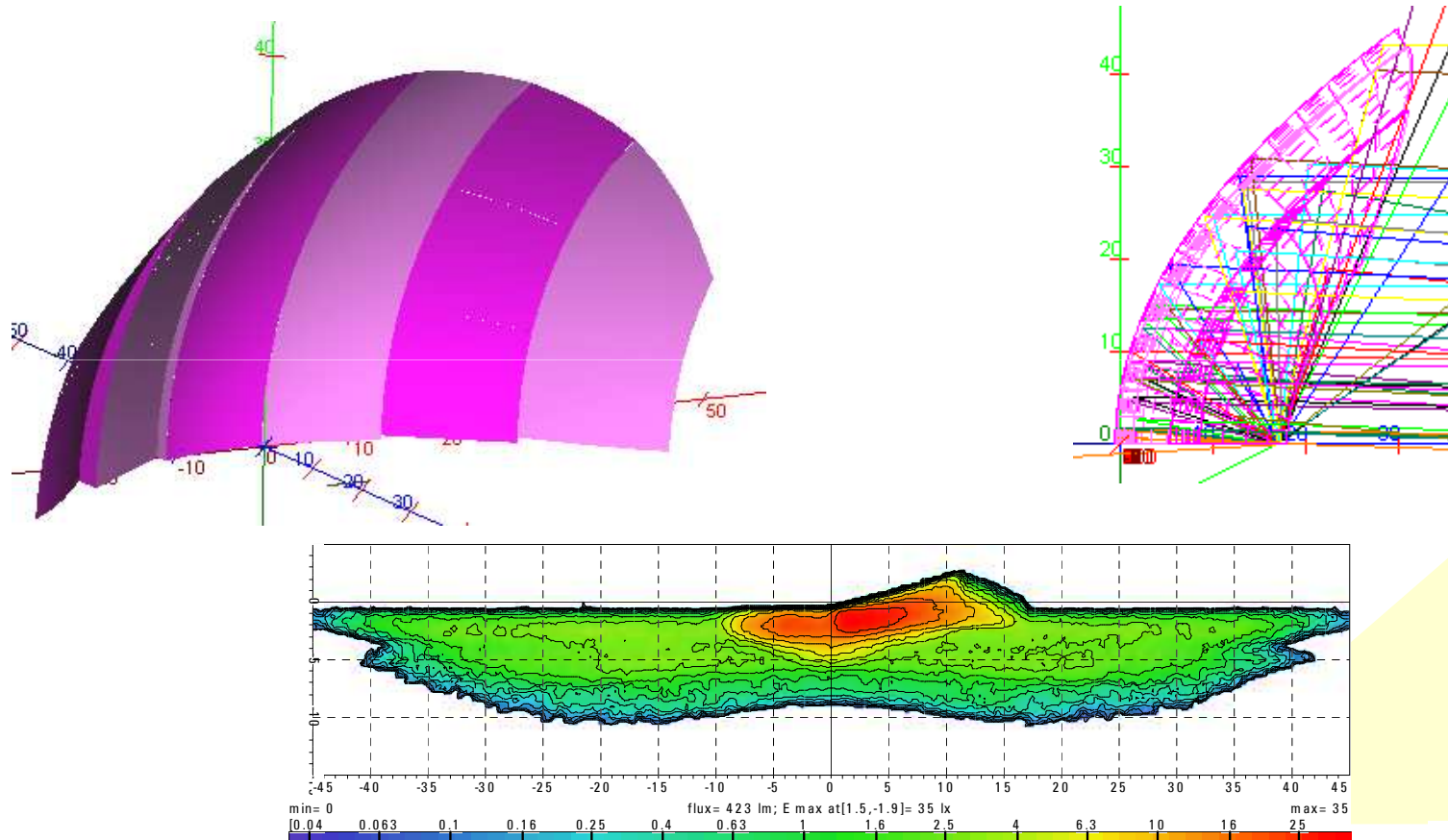


- Hot spot by 3 PES units
- Wide spread with torus lens

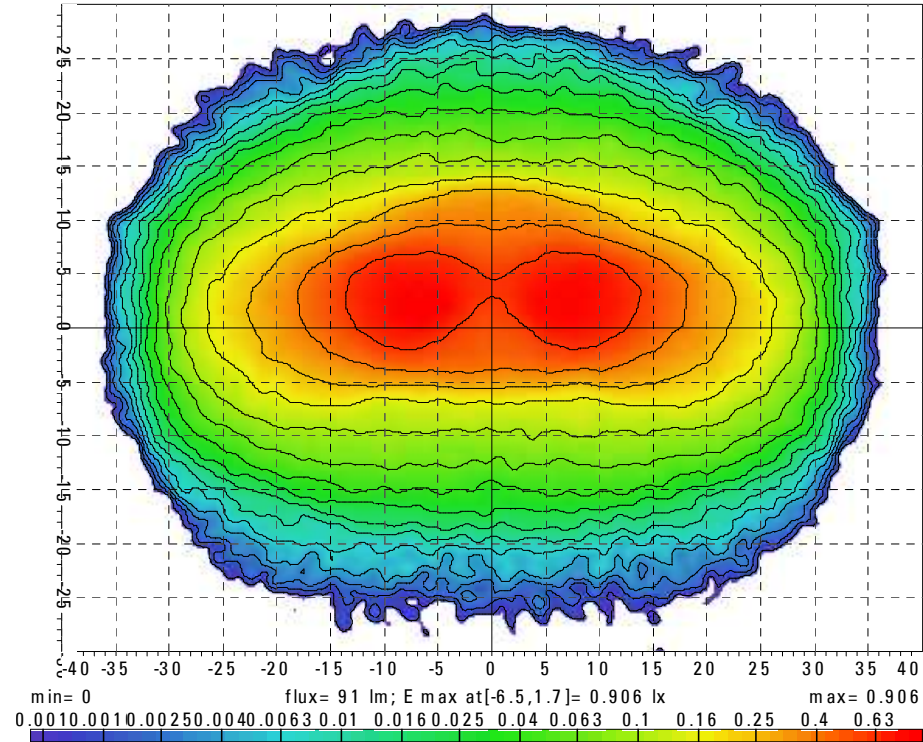
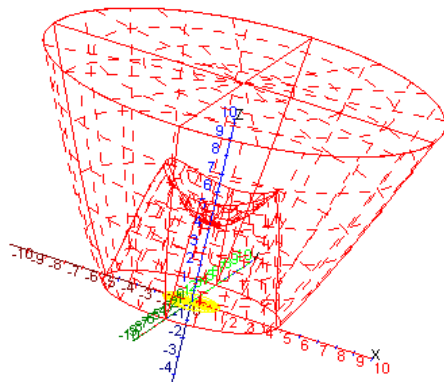
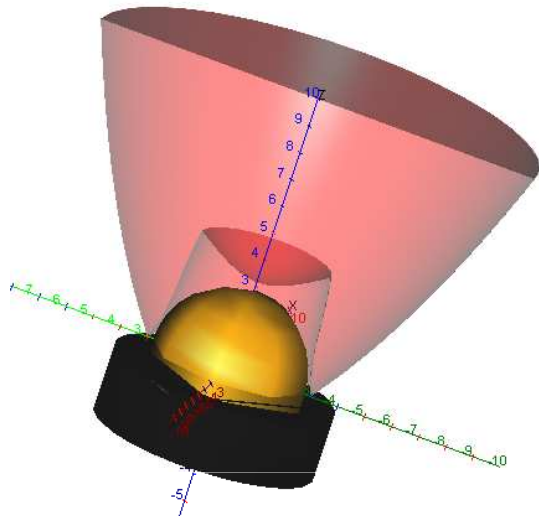


# LED low beam reflector

- Full low beam function out of a single reflector

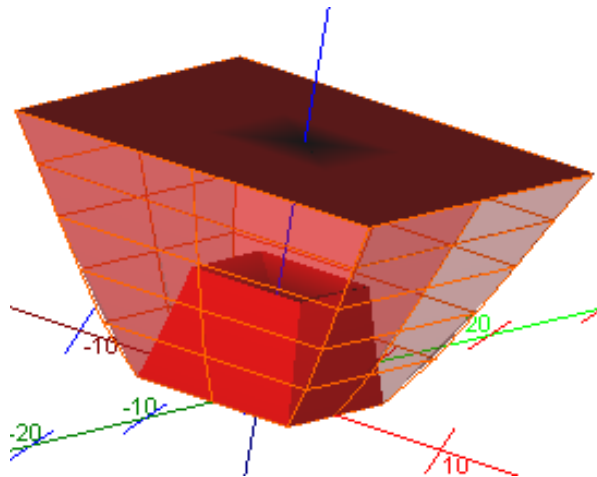
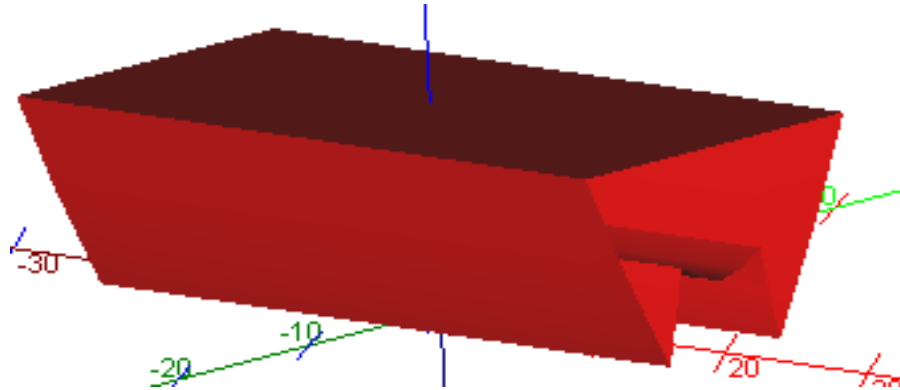


# LED Collimator



- LED collimator for high concentration and for
- asymmetric beam pattern for signal light function

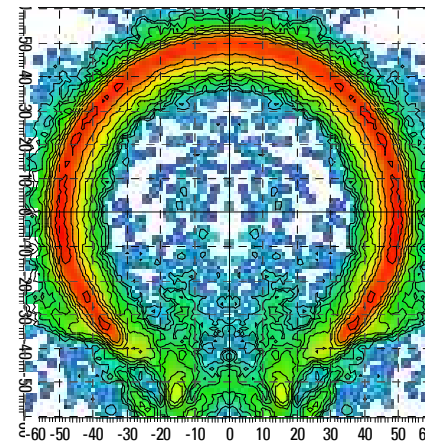
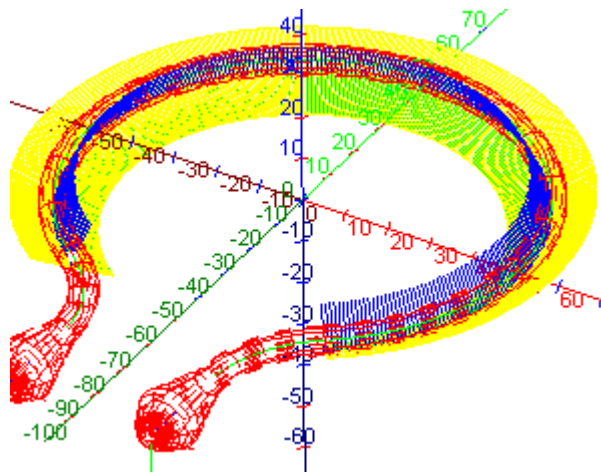
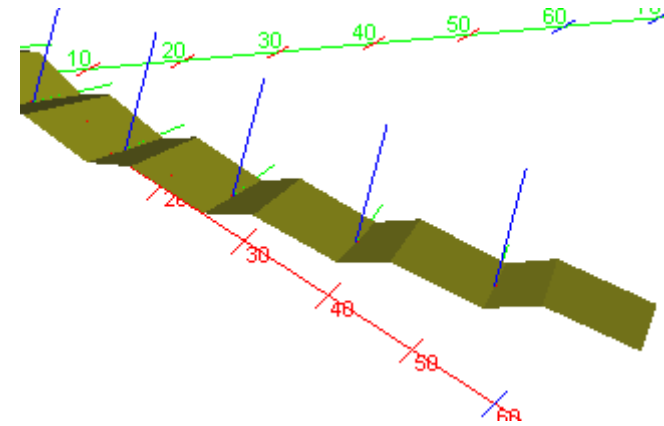
# LED Collimator II



- Various shapes are possible
  - round
  - elliptical
  - extruded
  - rectangle
- Styling solution like "edge" light

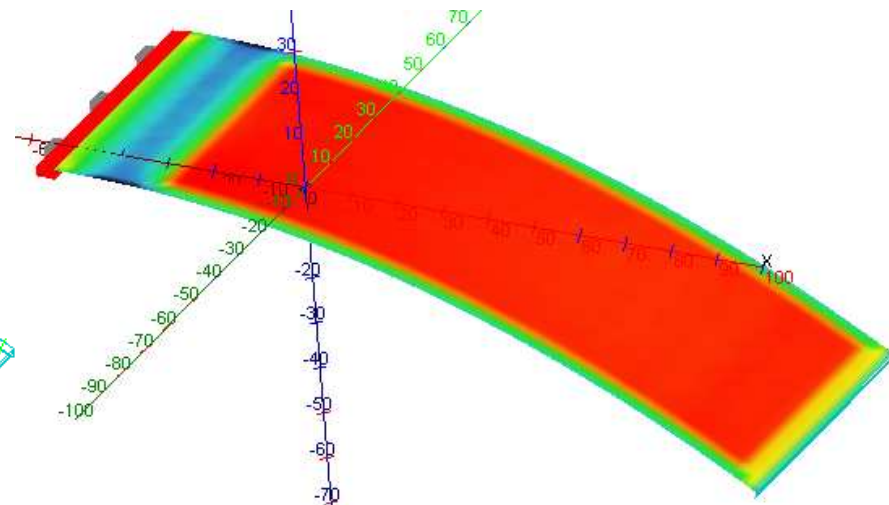
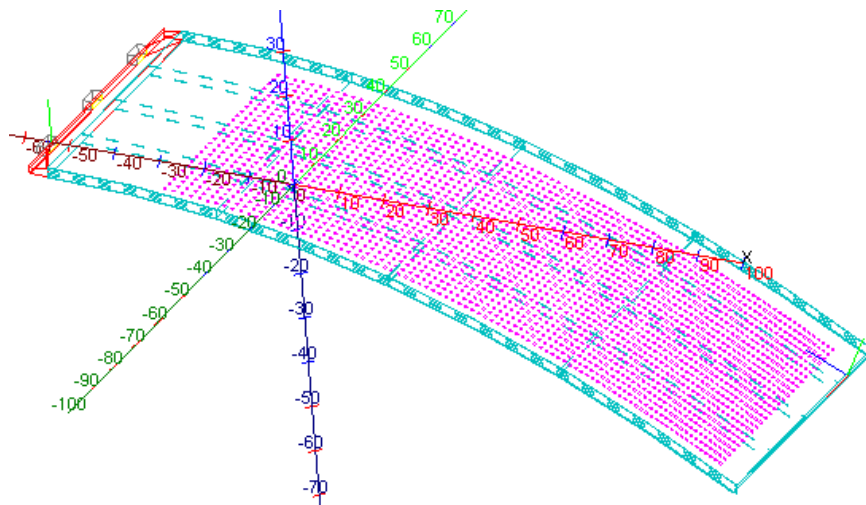
# Prism Band "Angel" light

- Band of prism
- Based on spine curve
- Controlled by light direction vector
- Variable prism angles

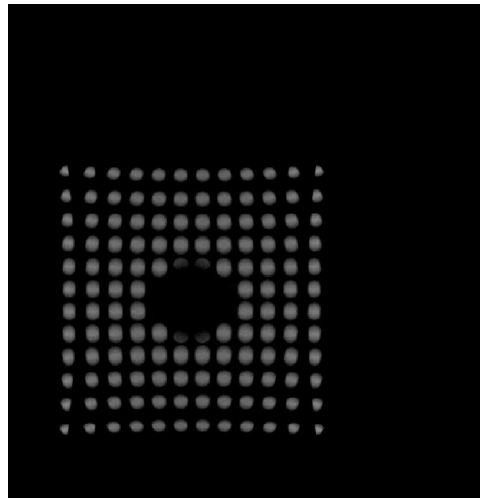
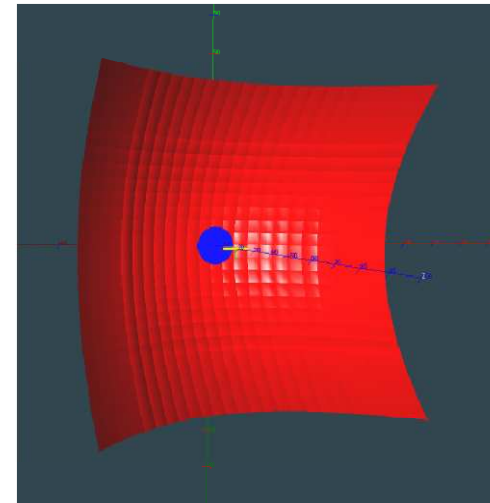
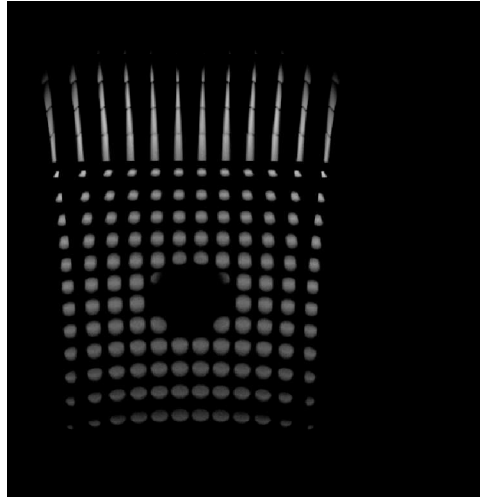


# Back lighting, "curtain" light

- FF surface with printed dot mask
- Variable pattern and structures
- 3D textures
- Used for curtain light



# Lit Appearance Analysis



Luminance images of a pillow type reflector obtained with the Luminance Camera