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Understanding Anisotropic Highlights for Interactive Appearance Editing

**Goals**
- Understand the shape of **anisotropic highlights** on arbitrary objects
- Infer local **BRDF orientations** from user-specified highlight shapes

**The shape of anisotropic highlights**

Highlight tangent field depends on variations...

... of **BRDF orientations** (geodesic curvature & splay)

... of **surface normals** (directional curvature & torsion)

Our non-linear solver optimizes BRDF orientations \( \varphi \) to yield the desired highlight tangent field \( \ell \)

Highlights deformed into their desired shape (red curves) in a few iterations.

**Highlight manipulation tools**

**Warp tool**
Deform the highlight tangent field to deviate trajectories of highlight curves

**Light tool**
Retrieve a light source given a point/tangent constraint for the highlight curve

**Stencil tool**
Paint a degenerate highlight region that quickly vanishes when lighting is rotated

**Additional results**

Top/bottom row: initial/edited highlights. Manipulations are preserved across material changes.

Manipulated highlights are preserved even in complex scenes rendered with global illumination.

**Conclusions**
- Provide **explicit relations** between highlights, lighting and surface properties.
- Future work: investigate **relevance** of highlight tangent formula to Human Vision.