Polarized 3D: High-Quality Depth Sensing with Polarization Cues
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**Contribution**
- Low-cost depth sensing

**Solution**
- Exploiting normals from polarization to enhance the quality of a coarse depth map
- A physics-based framework, wherein the coarse depth map is used to resolve azimuthal ambiguity and correct for refractive distortion
- A spanning tree integration schemes, specifically designed for polarization normals, which uses the degree of polarization as a weighting parameter

**Compare with other depth enhancement techniques**

**Verification**
- Robustness to various lighting condition
- Indoor Lighting
- Disco Ball
- Outdoors

**Results**
- Uncontrolled lighting, complex object

**Comparison with HQ Laser Scan**
- Enhanced Kinect Depth
- Laser Scanner Depth

**Take-home message:** "Coarse depth map + normals from polarization" reconstructs 3D shape with various materials, under uncontrolled lighting condition, and with diffuse interreflection.