

## LightTrans' talks at SPIE Photonics West 2019

# How the design concepts of high-NA beam splitters & diffusers, as well as of beam shapers by freeform surfaces, are related

**SPIE LASE – Session 10: Emerging Laser Components**

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Tailored laser illumination systems play a major role in various industrial applications, ranging from laser-beam splitting and diffusing to generate signal patterns with large fields of view for face and movement recognition, to shaping the wavefront of a laser beam using freeform surfaces. Several design concepts are based on topology control of the shaping element to avoid strong phase jumps or to minimize phase vortices and control the speckles of the illumination pattern at the signal plane. Other techniques follow a local shaping approach of the phase to control the wavefront, either over the whole element or in specific regions, with said regions arranged periodically to generate e.g. micro-lens arrays or randomly to generate diffusers of continuous surfacetopology. In particular, we show how these techniques are related to each other and how they can be used to improve maximum efficiency, uniformity of the intensity distribution and to minimize the zeroth order for non-paraxial illumination by laser beams.

