

Relating physical and visual global light field structures

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Poster

Relating physical and visual global light field structures

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The structure of a light field in a scene is dependent on the illumination, materials and scene geometry. We adapted the method for measurement and reconstruction of the physical light field introduced by Mury (2009) to cubic illuminance measurements using a device with a mini receptor head at each surface of a cube (Cuttle, 2014). Since human observers are sensitive to the properties of the physical light field, it is possible to measure the visual light field using probing methods (Pont, 2013). We will investigate the relation between physical and visual light fields in order to reveal possible (in-) congruencies between them.

Physical measurements and stimulus generation

We photographed and physically measured a scene that was similar to a common living room. We used three light configurations: a visible light source in the middle of the room, three aligned diffuse light sources on one side of the ceiling and four collimated light sources in the corners of the ceiling. These conditions form light fields of increasing global complexity.

Illuminance measurements were taken over a matrix of points using a cubic illuminance meter on the basis of a Konica Minolta T-10MA. The light fields were computed by means of linear interpolation of the coefficients of the first order spherical harmonic approximation between the neighbouring measurement points.

Psychophysical experiment

In each trial a “probe”, i.e., a white Lambertian sphere on a black monopod, was superimposed on a predetermined location in the image. The monopod end was always grounded on a surface defining the location

of the probe in the scene. The observer’s task was to change the parameters of the probe’s lighting (direction, intensity, diffuseness) in order to make it appear like it fits the scene.



Fig. 1: An example of a trial for three aligned diffuse light sources on the right side of the ceiling. For the current parameter settings the probe clearly does not fit the scene.

Results of the research will be presented on the conference.

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