

# Attenuation-based Light Field Displays

## **Bachelorarbeit**

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vorgelegt von

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## Abstract

Abstract goes here

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## Chapter 1

# Introduction

### 1.1 Related Work

## Chapter 2

# Capturing a Light Field

### 2.1 The Light Field and It's Properties

The plenoptic function, as introduced by [AB91], is a 7D function that describes the intensity of light for every frequency, along every light ray in space, at any time. It is defined as

$$P: \mathbb{R}^3 \times [0, 2\pi) \times [0, \pi] \times \mathbb{R}^2 \rightarrow \mathbb{R}^+ \\ (x, y, z, \theta, \phi, t, \lambda) \mapsto P(x, y, z, \theta, \phi, t, \lambda),$$

where the parameters  $(x, y, z)$  are the coordinates of a point in 3D space and the angles  $(\theta, \phi)$  describe the direction of an incoming light ray at time  $t$ . The light's intensity is given for every wavelength  $\lambda$  and thus, the plenoptic function not only captures the visible frequency spectrum but all electromagnetic waves. A commonly used measure for light is the radiance, which is obtained from  $P$  by integrating over all wavelengths:  $R(x, y, z, \theta, \phi, t) = \int_{\mathbb{R}} P(x, y, z, \theta, \phi, t, \lambda) d\lambda$ .

In practice, it is impossible to acquire all the data needed to model the 7D plenoptic function and hence it is reasonable to consider only a subset of the parameters. Dropping the time parameter  $t$  in  $R(x, y, z, \theta, \phi, t)$  yields a 5D function for the radiance in a static scene. As described by [LH96], this five dimensional representation can further be reduced to four dimensions.

# Appendix A

## ap1

### A.1 apsec1

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# **Erklärung**

gemäss Art. 28 Abs. 2 RSL 05

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