

**Modules:**

physics70a **Elective Advanced Lectures: Experimental Physics**

physics70b **Elective Advanced Lectures: Applied Physics**

**Course:****Holography (E/A)**

**Course No.:** physics734

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture	English	2	3	ST

**Requirements for Participation:****Preparation:****Form of Testing and Examination:**

Written or oral examination

**Length of Course:**

1 semester

**Aims of the Course:**

The goal of the course is to provide in-depth knowledge and to provide practical abilities in the field of holography as an actual topic of applied optics

**Contents of the Course:**

The course will cover the basic principle of holography, holographic recording materials, and applications of holography. In the first part the idea behind holography will be explained and different hologram types will be discussed (transmission and reflection holograms; thin and thick holograms; amplitude and phase holograms; white-light holograms; computer-generated holograms; printed holograms). A key issue is the holographic recording material, and several material classes will be introduced in the course (photographic emulsions; photochromic materials; photo-polymerization; photo-addressable polymers; photorefractive crystals; photosensitive inorganic glasses). In the third section several fascinating applications of holography will be discussed (art; security-features on credit cards, banknotes, and passports; laser technology; data storage; image processing; filters and switches for optical telecommunication networks; novelty filters; phase conjugation ["time machine"]; femtosecond holography; space-time conversion). Interested students can also participate in practical training. An experimental setup to fabricate own holograms is available

**Recommended Literature:**

Lecture notes;

P. Hariharan; Optical Holography - Principles, Techniques, and Applications (Cambridge University Press, 2nd Edition, 1996)

P. Hariharan; Basics of Holography (Cambridge University Press 2002)

J. W. Goodman; Introduction to Fourier Optics (McGraw-Hill Education - Europe 2nd Ed. 2000)

A. Yariv; Photonics (Oxford University Press 6th Ed. 2006)