

[PS-01] 초청강연

Course prospect Laser assisted microtechnology

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Lasers now is an essential tool for microfabrication in micromechanics, microelectronics and microoptics areas in interests of microsystems, medicine, communication, computer and other kind of technique.

The Course will concentrate on laser assisted microshaping processes, based on laser ablation and laser heating. The fundamentals of laser action on microcomponents are given: light absorption, heating, melting, evaporation, ablation etc. The accuracy and quality problems have to be especially detailed discussed in different aspects: for thin films patterning and hole drilling, for microoptics fabrication and microcomponents trimming. The influence on the microshaping results by the laser parameters, as well as optical beam skills and laser matter interaction processes are discussed.

The main parts of the Course are:

1. Microshaping for micromechanical components: precision laser cutting, hole drilling, scribing, marking, engraving etc. Analysis and synthesis of precision processes. CW or pulse repetition mode? Role of temporal structure of the pulses. Role of liquid phase. Role of spatial structure of laser beam. Multipulse drilling and cutting conception.
2. Thin film microprocessing: modern laser lithography, including mask generation and mask saving, electronic components trimming, data recording and processing.
3. Fabrication of microoptics. Peculiarities of optical materials and processes. Laser assisted microshaping by laser heating and mechanical forces using. Plasma assisted laser ablation for microprofiling and polishing of optical materials.

Every part consist correspondingly from fundamentals of laser microtechnology: laser sources, optical beam shaping systems, laser matter interaction.

The combination of 3 short courses will give audiences relatively full supression of the stateofart and of the perspectives of this spreadly developed area. The Course can also be done separately for every part.

The duration of the Course depends on the purpose and can be changed from 8 to 16 academic hours.

[References]

1. V.P.Veiko, S.M.Metev. Laser assisted microtechnology. Springer Verlag, Heidelberg, 1994 (first edition), 1998 (second edition).
2. Laser impulse Thermolithography. Short Course SC28 lectures notes, Symposium of Microlithography, San Jose, USA, 812.03.92.
3. Laser technology for microoptical components fabrication. Short Course SC30 lectures notes, Photonics West-96, Photonics West-97.
4. Fabrication of microoptics. Short Course CEU.035 Industrial Lasers and Inspection, Munich, Germany, 1999.