



TECHNISCHE  
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# IAP-SEMINAR

## EINLADUNG

Termin: **Dienstag, 15.5.2012 um 16:00 Uhr**  
Ort: **Technische Universität Wien,  
Institut für Angewandte Physik,  
Seminarraum 134A, Turm B (gelbe Leitfarbe), 5. OG  
1040 Wien, Wiedner Hauptstraße 8-10**

Vortragender: **MSc. Aliasghar Ajami**  
TU Wien, IAP

Thema: **Multi-photon Absorption: measurement of Cross sections  
and selected Applications**

### Kurzfassung

Multi-photon absorption is a nonlinear process in which two or more photons are nearly simultaneously absorbed to excite a molecule from ground state to an excited state via virtual states. Many techniques have been proposed to determine the multi-photon absorption cross section within them the Z-scan method is the most sensitive and also easiest to perform. The Z-scan technique is a single beam method in which the nonlinear sample is scanned along the propagation direction of a tightly focused laser beam while the transmitted energy through the sample is measured as a function of the sample position. We extended existing theories in order to eliminate limitation for evaluating the two-photon absorption (TPA) of samples in general. In particular, the cross section of various Two-photon initiators (TPI) has been determined. The special design of these compounds is aimed at increase of their TPA cross section in order to be utilized in two-photon induced polymerization (TPIP). TPIP is a potential application of TPA by which a real 3D structure can be created. In this process an ultrashort pulsed laser beam is tightly focused within a resin mixed with a TPI using a high numerical aperture objective. Due to the intensity dependence nature of nonlinear absorption, only in a small volume around the focal point the nonlinear absorption could happens. A TPI molecule is dissociated after absorbing light and produce free radicals which trigger the polymerization process. Scanning the focal point of the laser beam within the resin in three dimensions allows one to create a real 3D micro-structure. Several illustrative examples of 3D microstructures fabricated in our lab will be presented to demonstrate the interesting aspects of the method.

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*Alle interessierten Kolleginnen und Kollegen sind zu diesem Seminar  
(45 min mit anschließender gemeinsamer Diskussion) herzlich eingeladen.*

*F. Aumayr e.h.  
(Seminar-Chairperson)*

*H. Störi e.h.  
(LVA-Leiter)*