



## **Workshop Tolerancing Using CODE V By Rainer Jetter**

When doing professional optical tolerancing it is important to try to reproduce what may happen in fabrication and mounting. This can easily be done using CODE V's tolerancing tools. However we need to understand what happens during fabrication. We need also to understand how we can specify the tolerances using ISO 10110. There are some pitfalls using it.

In this workshop we will learn about all the features in CODE V that help us to find the right tolerances and how we can predict the yield in fabrication. We will apply the learnt in realistic examples using CODE V. This workshop is open to discuss the problems that come from your experience. This workshop is for somewhat experienced and experienced CODE V users.

### **Contents:**

#### **Day 1: Basics**

- DIN ISO 10110
- Excursus Zernike polynomials
- How are lenses made? What errors occur there?
- How are lenses mounted? What errors occur there?
- Optical material and tolerances.
- Tolerances in CODE V
- How can we build up the tolerances in CODE V
- Practical examples
- Statistics in Tolerancing
- Compensators

#### **Day 2: Tools in CODE V**

- The TOL option and its use in optical tolerancing
- Practical examples
- The TOR option
- Practical examples
- Using SVD calculations to find the right tolerances
- The TOD option
- Practical example
- Six Sigma in optical fabrication



### **Day 3: Monte Carlo Simulations and desensitization**

- TOLDIF
- TOLMONTE
- User defined probability functions
- Doing statistical simulations
- Tools to desensitize an optical system
- Practical examples in desensitization
- Open discussion