

Master 2009

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Definition Effects of material transparency on the formation of Fresnel-type diffraction patterns

*ABSTRACT - Masterthesis*

The Abstract

Due to the industrial demand of online non-contact measurement of transparent tubes and hoses, SIKORA AG Company, a manufacturer of measurement equipment for wire and cable industry, seeks to fulfil this need. As an initial step to proceed with research in this area, this thesis investigates the behaviour of glass rods regarding the diffraction of light which is the basis of the measuring method.

The work in this thesis is directed mainly into two parts. The first part includes practical measurements on glass rods conducted by already existing gauges from SIKORA used for measuring opaque wires and tubes. Within this part, the changes of the diffraction pattern due to the glass rod transparency are inspected as well as the resulting measured diameter values are investigated. The second part of the work tries to simulate the diffraction problem of glass rods. After that several investigations are performed on the simulation results.

This thesis is a cooperation work between Hochschule Bremen, Institute i3m and SIKORA AG, Bremen.