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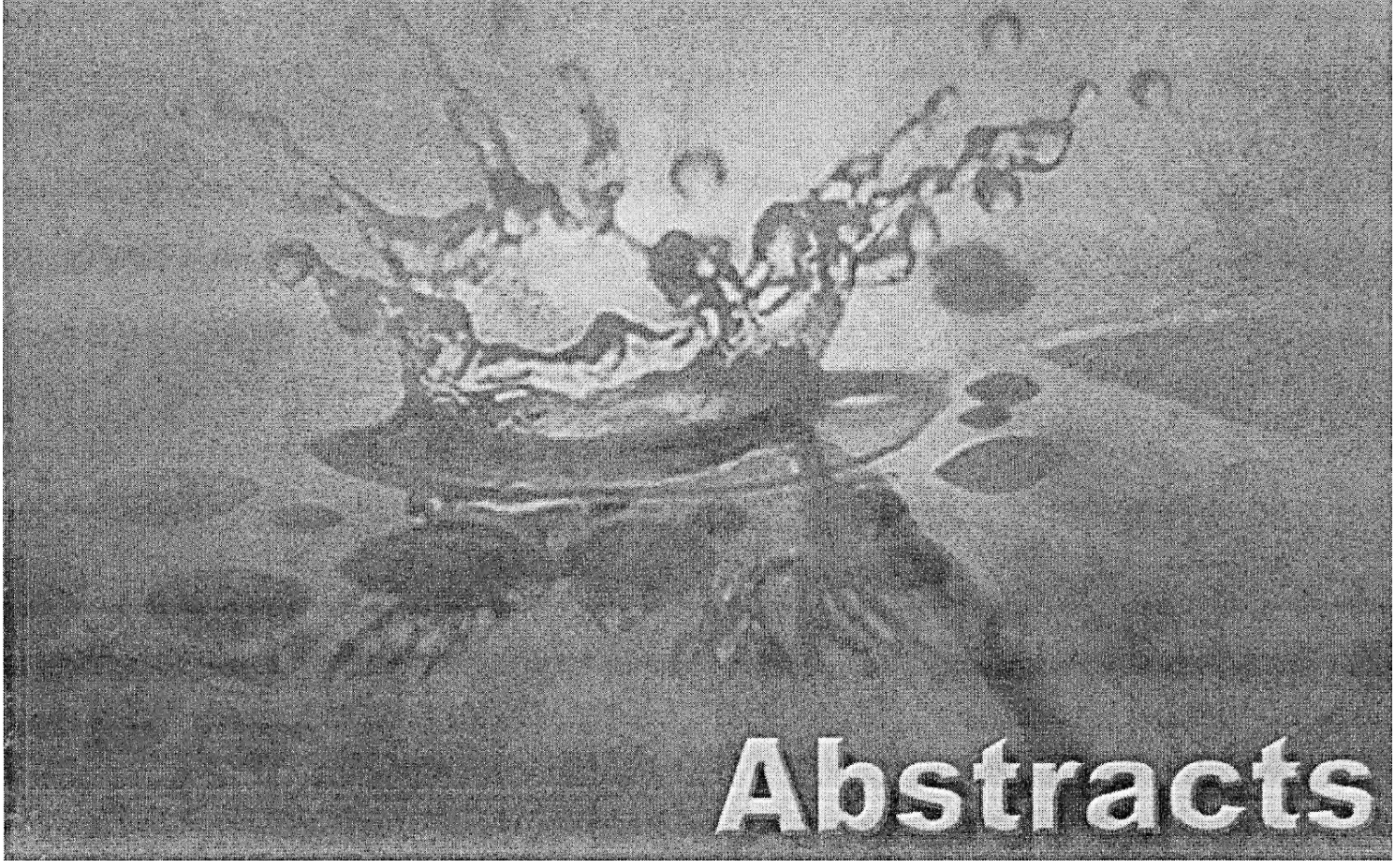

Abstracts

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3-D Behavior of Photopolymers as Holographic Recording Material

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Research dealing with models to predict and understand the behaviour of photopolymers have generated many interesting works considering a 2-dimensional geometry [1-2]. These models suppose that the photopolymer layer is homogeneous in depth. Using this approximation good results can be obtained if the thickness of photopolymers is lower than 200 μm [3]. However, it is well known that Lambert-Beer's law predicts an exponential decay of the light inside the material [4]. In recent years the development of new holographic memories based on photopolymers have focused intensive efforts. For this application the thickness of the layer is increased, typically becomes larger than 500 μm [5], and Lambert-Beer's law plays a significant role on the recording step. The attenuation of the index profile inside these materials has been measured, showing that attenuation is an important phenomenon. This attenuation limits the maximum effective optical thickness of the grating and shows that the 2-D models can not be applied in these cases. For this reason in this work a 3-dimensional model is presented to analyse the real behaviour of the photopolymers and study the variations of the index profile in depth. The theoretical results show the importance of both the dye concentration and the specific kind of dye chosen in the final 3-dimensional profile recorded. The differences between viscous and liquid systems are also studied in 3-D cases. Eventually, the limitation of the data storage capacity of the materials due to the Lambert-Beer's law is evaluated.

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