

Opto-Electronics Review, 2016, volume 24, issue 4, pp. 163-168

## **Coupled electric fields in photorefractive driven liquid crystal hybrid cells – theory and numerical simulation**

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DOI: <https://doi.org/10.1515/oere-2016-0026>

### **Abstract:**

In cyclic articles previously published we described and analysed self-organized light fibres inside a liquid crystalline (LC) cell contained photosensitive polymer (PP) layer. Such asymmetric LC cell we call a hybrid LC cell. Light fibre arises along a laser beam path directed in plane of an LC cell. It means that a laser beam is parallel to photosensitive layer. We observed the asymmetric LC cell response on an external driving field polarization. Observation has been done for an AC field first. It is the reason we decided to carry out a detailed research for a DC driving field to obtain an LC cell response step by step. The properly prepared LC cell has been built with an isolating layer and garbage ions deletion. We proved by means of a physical model, as well as a numerical simulation that LC asymmetric response strongly depends on junction barriers between PP and LC layers. New parametric model for a junction barrier on PP/LC boundary has been proposed. Such model is very useful because of lack of proper conductivity and charge carriers of band structure data on LC material.