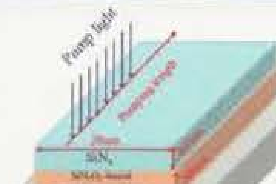
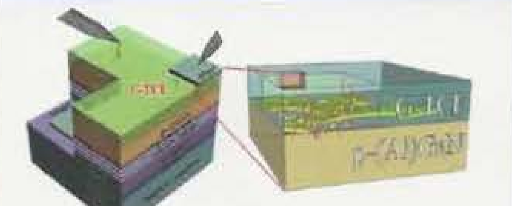
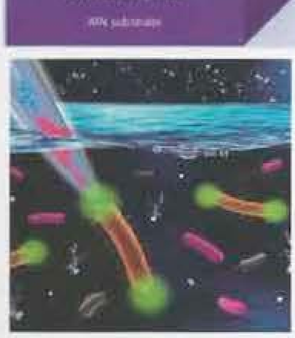
EMN MEETING

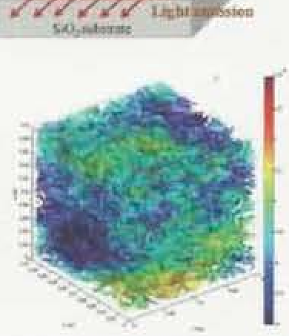
2017 EMN Meeting on Photonics &
Collaborative Conference on Plasma Physics
Energy Materials Nanotechnology
September 4th-8th in Budapest, Hungary

Program&Abstracts









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Thursday September 7 Rakoczi I Room A		
Session: Silicon Photonics Chair: Francisco Javier Martínez Guardiola		
13:30 -13:55	A44: Electroluminescence efficiencies of rare earth ions in silicon-based hosts	**Christophe Labbé** Laboratoire CIMAP, France A55
13:55 -14:20	A45: Hyperuniform disordered materials and devices for silicon photonics	**Milan Milosevic** University of Southampton, UK A56
14:20-14:45	A46: Efficient near-infrared light emission and optical gain in Si quantum dots based on silicon oxynitride multilayer structures	**Rui Huang** Hanshan Normal University, China A57
14:45-15:10	A47: Strained germanium: A promising material platform for the development of Si-compatible infrared laser	**Çiçek Boztuğ** TED University, Turkey A59
15:10-15:35	A48: Spin-dependent direct gap emission in tensile-strained Ge films on Si substrates	**Elisa Vitiello** Università degli Studi di Milano Bicocca, Italy A60
15:35-15:55	Session Break	
Session: Novel Photonic Devices Chair: Milan Milosevic		
15:55-16:20	A49: Multipurpose semi-physical model for parallel aligned liquid crystal devices	**Francisco Javier Martínez Guardiola** Universidad de Alicante, Spain A61
16:20-16:45	A50: Curved Surface Nano-Lithography with Applications on Optical Anti-Reflection and Plasmon Resonance	**Yung-Chun Lee** National Cheng Kung University, Tainan, Taiwan A63
16:45-17:10	A51: Silicon subwavelength metamaterials: from basics to recent applications	**Robert Halir** Universidad de Málaga, Spain A64
17:10-17:35	A52: Solubility Correlation of Thermochromism and Photovoltiac of pBCN Copolymers	**Chin-Ti Chen** Institute of Chemistry, Academia Sinica, Taiwan A65
17:35-18:00	A53: Plasmon-Enhanced Spectroscopies on Nanostructured Films Obtained by Colloidal Self-Assembly	**Cosmin Farcau** Babes-Bolyai University, Romania A66
18:10	Dinner Social	

A49: Multipurpose semi-physical model for parallel aligned liquid crystal devices

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The Parallel Aligned Liquid Crystal microdisplays (PA-LC) has become a widely used device for optics and photonics applications. Our group has done an intense work for characterizing this kind of displays. We propose a PA-LC model that allows us to predict the device performance in a wide range of incidence angles and for any wavelength in the visible.

We have applied a reverse engineering approach that, from a reduced amount of measurements, allows us to infer some parameters related with the manufacturing of the device. These parameters are usually hidden to the normal user, and they can be interesting in order to design our photonic application.

We use an averaged Stokes polarimetric method to obtain the retardance introduced for every gray level [1]. This method provides us the retardance measurements that will be used to calculate some parameters in our proposed model of a PA-LC cell.

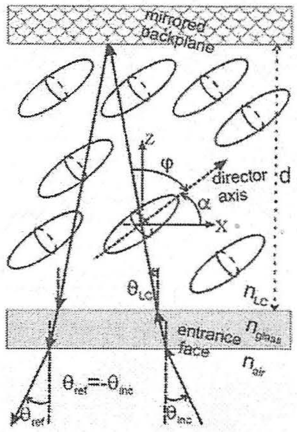

Fig1. Diagram for the PA-LC cell used in proposed model.

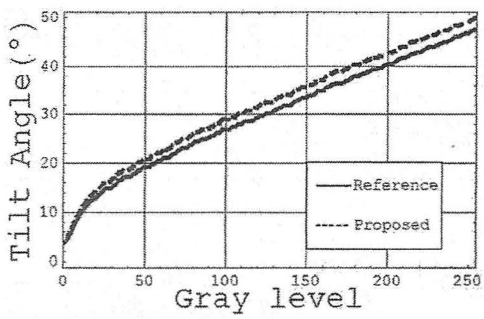

Fig2. LC-director Tilt angle as a function of Gray level

From the model presented in fig. 1, we do not know the parameters such as refraction indices or the cell gap *d*. To avoid this lack of knowledge we will define some optical parameters that we can fit from the calibration measurements [2]. The measurements used are the retardance as a function of gray level (ON-State) for incidences angles of 3° and 35°, and the retardance introduced with the display switched off at these incidences (OFF-State). Fitting these measurements with the analytical expression provided by our model we obtain the values for the two OFF-State parameters in the model, and we can infer too, the angle formed by the LC-director for the different gray levels applied (ON-State), shown in fig2. Afterwards we can use the analytical expression to compute the retardance range for every wavelength in the visible and for different angles of incidence.

In summary, we have validated a semi-physical model for PA-LC cells, and used it to predict the performance of our displays in a specific experiment. All the information extracted comes from a very easy to implement characterization method as the average Stokes polarimetry presented in a previous work [1].

Acknowledgements: This work has been supported by Ministerio de Economía, Industria y Competitividad of Spain (projects FIS2014-56100-C2-1-P and FIS2015-66570-P), and Generalitat Valenciana of Spain (project PROMETEOII/2015/015).

1. F. J. Martínez et al. "Retardance and flicker modeling and characterization of electro-optic linear retarders by averaged Stokes polarimetry", Opt. Lett., 34, 1011-4 (2014)
2. F. J. Martínez et al. "Effective angular and wavelength modelling of parallel aligned liquid crystal devices". Opt. Lasers Eng. 74, 114-121 (2015)