Front Matter: Volume 9384
**Emerging Liquid Crystal Technologies X**

Liang-Chy Chien  
Harry J. Coles  
Hirotugu Kikuchi  
Ivan I. Smalyukh  
*Editors*

9–11 February 2015  
San Francisco, California, United States

Sponsored and Published by  
SPIE

Volume 9384
Contents

v Authors

vii Conference Committee

ix Introduction

SESSION 1 NANOPARTICLES DOPED SYSTEMS

9384 02 Nematic topological line defects as optical waveguides (Keynote Paper) [9384-1]

SESSION 2 SOFT MECHANICS AND METAMATERIALS

9384 06 Surface dynamics and mechanics in liquid crystal polymer coatings (Invited Paper) [9384-5]

9384 0A Single-photon experiments with liquid crystals for quantum science and quantum engineering applications (Invited Paper) [9384-46]

SESSION 3 NEW MATERIALS AND EFFECTS

9384 0B Light-directing self-organized 1D and 3D chiral liquid crystalline nanostructures (Keynote Paper) [9384-9]

9384 0E Thin film polarizer and color filter based on photo-polymerizable nematic liquid crystal [9384-12]

SESSION 4 CHIRAL PHASES AND APPLICATIONS

9384 0H Stabilizing blue phase liquid crystals with linearly polarized UV light (Invited Paper) [9384-15]

9384 0I Electro-optical behavior of polymer dispersed blue phase liquid crystals [9384-16]

9384 0J Field-induced Bragg diffraction in polymer stabilized cholesteric liquid crystal bubbles [9384-17]

SESSION 5 WAVEGUIDES AND SPATIAL LIGHT MODULATORS

9384 0L Liquid crystal waveguide technologies for a new generation of low-power photonic integrated circuits (Invited Paper) [9384-19]
<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>ACTIVE FILTERS AND RETARDERS</td>
</tr>
<tr>
<td>0Q</td>
<td>Liquid crystal photonics with indium tin oxide nanowhiskers and graphene as functional electrodes (Invited Paper)</td>
</tr>
<tr>
<td>0T</td>
<td>Dynamic and complex optical patterns from colloids of cholesteric liquid crystal droplets (Invited Paper)</td>
</tr>
<tr>
<td>7</td>
<td>FAST-SWITCHING AND BISTABLE DEVICES</td>
</tr>
<tr>
<td>0U</td>
<td>Nanosecond electric modification of order parameter in nematic and isotropic phases of materials with negative and positive dielectric anisotropy (Keynote Paper)</td>
</tr>
<tr>
<td>0V</td>
<td>Fast bistable switching of a chiral-nematic liquid crystal cell induced by applying an in-plane electric field</td>
</tr>
<tr>
<td>0W</td>
<td>Wide-color gamut multi-twist retarders</td>
</tr>
<tr>
<td>8</td>
<td>LENS AND 3D DISPLAYS</td>
</tr>
<tr>
<td>10</td>
<td>A liquid crystal and polymer composite film for liquid crystal lenses (Invited Paper)</td>
</tr>
<tr>
<td>11</td>
<td>An electrically tunable liquid crystal lens coupler for the fiber communication systems</td>
</tr>
<tr>
<td>12</td>
<td>Super-fast refresh holographic liquid crystals for holographic 3D display</td>
</tr>
<tr>
<td>13</td>
<td>A polarized liquid crystal lens with electrically switching mode and optically written mode</td>
</tr>
<tr>
<td></td>
<td>POSTER SESSION</td>
</tr>
<tr>
<td>16</td>
<td>Fast gray-to-gray switching of a hybrid-aligned liquid crystal cell</td>
</tr>
<tr>
<td>17</td>
<td>Double-layered liquid crystal light shutter for control of absorption and scattering of the light incident to a transparent display device</td>
</tr>
</tbody>
</table>
Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Asquini, Rita, 0L
Beccherelli, Romeo, 0L
Beeckman, Jeroen, 0E
Bisoyi, Hari Krishna, 0B
Bissell, Luke J., 0A
Borschch, Volodymyr, 0U
Boyd, Robert W., 0A
Brockson, Leandra L., 0W
Broer, Dirk J., 06
Cančula, Miha, 02
Chang, Chia-Ming, 10, 13
Chen, Chyong-Hua, 11
Chen, Haiwei, 0N
Chen, Hung-Shan, 10, 13
Chen, Michael, 11
Chien, Liang-Chy, 0I, 0J
Čigančula, Miha, 02
Chigrinov, Vladimir Grigorievich, 13
Choi, Tae-Hoon, 17
Civita, Luca, 0L
d’Alessandro, Antonino, 0L
Davis, Scott R., 0M
Drevensek-Olenik, Irena, 0T
Escuti, Michael J., 0W
Gao, Hongyue, 12
Gehring, George M., 0A
Homburg, Kathryn J., 0W
Huh, Jae-Won, 17
Keller, Sean D., 0M
Kemiklioglu, E., 0I
Kim, Jung-Wook, 16
Lagewaard, Jan P. F., 0T
Lavrentovich, Oleg D., 0U
Li, Bing-Xiang, 0U
Li, Quan, 0B
Liapis, Andreas C., 0A
Lin, Yi-Hsin, 10, 11, 13
Liu, Danqing, 06
Liu, Jicheng, 12
Liu, Pan, 12
Lukishova, Svetlana G., 0A
Lynch, Ted, 0M
Martini, Luca, 0L
MohammadiMasoudi, Mohammad, 0E
Neys, Kristiaan, 0E
Noh, Jung-Hyun, 0T
Oh, Seung-Won, 0V
Pan, Ci-Ling, 0Q
Pan, Ru-Pin, 0Q
Peng, Fenglin, 0N
Pino, Juan, 0M
Ravnik, Miha, 02
Rommel, Scott D., 0M
Schadt, Martin, 0H
Shin, Dong-Myung, 17
Shvianovskii, Sergij V., 0U
Srivorstava, Abhishek Kumar, 13
Sun, Jia Tong, 13
Tripathi, Suvagata, 0N
Twieg, Robert J., 0N
Uyeno, Gerald P., 0M
Varanytsia, Andrii, 0J
Wang, Yu-Jen, 10, 13
Winkler, Justin M., 0A
Wu, Shin-Tsan, 0H, 0N
Xu, Daming, 0H
Yamamoto, Jun, 0T
Yan, Jing, 0H
Yang, Chan-Shan, 0Q
Yao, Qiuxiang, 12
Yoon, Tae-Hoon, 0V, 16, 17
Yu, Byeong-Hun, 17
Yu, Yingjie, 12
Yuan, Jianming, 0H
Zeng, Chao, 12
Zheng, Huadong, 12
Žumer, Slobodan, 02
Conference Committee

Symposium Chairs

David L. Andrews, University of East Anglia (United Kingdom)
Alexei L. Glebov, OptiGrate Corporation (United States)

Symposium Co-chairs

Jean-Emmanuel Broquin, IMEP-LAHC (France)
Shibin Jiang, AdValue Photonics, Inc. (United States)

Program Track Chair

Liang-Chy Chien, Kent State University (United States)

Conference Chair

Liang-Chy Chien, Kent State University (United States)

Conference Co-chairs

Harry J. Coles, University of Cambridge (United Kingdom)
Hirotsugu Kikuchi, Kyushu University (Japan)
Ivan I. Smalyukh, University of Colorado at Boulder (United States)

Conference Program Committee

Dick J. Broer, Technische Universiteit Eindhoven (Netherlands)
Vladimir G. Chigrinov, Hong Kong University of Science and Technology (Hong Kong, China)
Antonio Martins Figueiredo Neto, Universidade de São Paulo (Brazil)
Andy Y. G. Fuh, National Cheng Kung University (Taiwan)
Heinz S. Kitzerow, Universität Paderborn (Germany)
Jan P. Lagerwall, Seoul National University (Korea, Republic of)
Yi-Hsin Lin, National Chiao Tung University (Taiwan)
Yan-Qing Lu, Nanjing University (China)
Kristiaan Neyts, Universiteit Gent (Belgium)
Masanori Ozaki, Osaka University (Japan)
Ci-Ling Pan, National Tsing Hua University (Taiwan)
Miha Ravnik, University of Ljubljana (Slovenia)
Richard Sutherland, Mount Vernon Nazarene University (United States)
Nelson V. Tabiryan, BEAM Engineering for Advanced Measurements Company (United States)
Timothy J. White, Air Force Research Laboratory (United States)
Ming Hsien Wu, Hamamatsu Corporation (United States)
Shin-Tson Wu, CREOL, The College of Optics and Photonics, University of Central Florida (United States)
Huai Yang, Peking University (China)
Hiroshi Yokoyama, Kent State University (United States)
Tae-Hoon Yoon, Pusan National University (Korea, Republic of)
Yanlei Yu, Fudan University (China)

Session Chairs

1 Nanoparticles Doped Systems
   Oleg Lavrentovich, Kent State University (United States)

2 Soft Mechanics and Metamaterials
   Slobodan Žumer, University of Ljubljana (Slovenia)

3 New Materials and Effects
   Hirotugu Kikuchi, Kyushu University (Japan)

4 Chiral Phases and Applications
   Dick J. Broer, Technische Universiteit Eindhoven (Netherlands)

5 Waveguides and Spatial Light Modulators
   Michael J. Escuti, North Carolina State University (United States)

6 Active Filters and Retarders
   Andy Ying-Guey Fuh, National Cheng Kung University (Taiwan)
   Timothy J. Bunning, Air Force Research Laboratory (United States)

7 Fast-Switching and Bistable Devices
   Tae-Hoon Yoon, Pusan National University (Korea, Republic of)

8 Lens and 3D Displays
   Kristiaan Neyts, Universiteit Gent (Belgium)
Introduction

As the world’s leading conference in liquid crystal optics, photonics and displays, the 2015 SPIE Photonics West "Emerging Liquid Crystal Technologies X" conference successfully drew a large and enthusiastic crowd. The conference provided a platform for intellectual and enlightening discussions of current state and exploration of emerging frontiers of liquid crystal science and technologies in optics, photonics and displays.

The scientific program featured keynote, invited and contributed papers, which covered a wide range of topics such as Nanoparticles Doped Systems, Soft Mechanics and Metamaterials, New Materials and Effects, Chiral Phases and Applications, Waveguides and Spatial Light Modulators, Active Filters and Retarders, Fast-Switching and Bistable Devices, and Lens and 3D Displays. The group of participants included a good number of invited speakers, junior scientists and graduate students who gave their research presentations at the conference. Student papers presented at both the oral and poster sessions drew large attendance and heavy traffic. I highly appreciate the program co-chairs and committee members for their contributions, which are the foundation of this successful conference.

We look forward to seeing you at the Emerging Liquid Crystal Technologies XI conference in 2016.

Liang-Chy Chien
Harry J. Coles
Hirotugu Kikuchi
Ivan I. Smalyukh