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SOCIETY FOR INFORMATION DISPLAY

SID-ME Chapter Fall 2003 meeting on Display Manufacturing and Flexible Displays organized by the Swedish LCD Center and Dalarna University, Borlänge, Sweden

Borlänge-Sweden, October 6-7, 2003

The SID-ME Chapter Fall 2003 meeting on Display Components and Technology was organized jointly by the Swedish LCD Center and Dalarna University both situated in "Crystal Valley" in Borlänge. "Crystal Valley" is a cluster of LCD companies and subcontractors, including the LCD center and the University, that join forces to foster growth of the regional high-tech LCD industry and explore the future of LCD. More than 100 people attended the meeting in Borlänge, including participants from the US, Belarus, Taiwan and India. The meeting was opened by Prof. Rolf Magnusson and Prof. Kent Skarp. Prof. Rolf Magnusson noted that the area had a substantial material, a.o. steel and wood, based industry, which was now expanding with high tech LCD industry. Prof. Kent Skarp gave an overview of the Swedish LCD Center and the education program at Dalarna University which includes a "Master of Display Technology" course. N. Fruehauf welcomed the attendants on behalf of the SID-ME Chapter and complimented the organizers with the program.

Session 1, October 6, afternoon

E. Maiser (DFF, German Flat Panel Display Forum) discussed EFF and the ADRIA project. This concerns new initiatives to promote European display research and production. The ADRIA project stands for Advanced Display Research Integration Action and involves work packages on context mapping, road mapping, education etc.

Mrs. M. Kharazzi Olsson (Uniaxis Balzers AG, Liechtenstein) talked about the use of solid state conformal thin films to serve as encapsulating layers for OLED devices. SiNx and SiOxNy layers produced by the Balzers PECVD KAI system are currently tested, checking their barrier properties for water and oxygen with a pure calcium layer.

R. Pantou. (Fraunhofer-Institut für Photonische Microsysteme, Dresden) presented highly efficient OLED structures and dis-

cussed steps towards next generation OLED displays. With recent phosphorescent pin-devices power efficiency values in excess of 60 lm/W were reported. Also the progress made in the transfer of technology from laboratory prototypes to production samples manufactured in an in-line production tool was discussed.

M. Swegers (*Ushio Europe BV, Netherlands*) gave a talk on the use of excimer lamps in LCD and OLED manufacturing. The vacuum-ultra-violet emission at 172 nm from a Xe dielectric barrier discharge lamp generates Oxygen radicals that react with surface contaminants to form volatile products.

Session 2, October 6 , afternoon

M. Alexandersson (*LC-Tec Displays, Borlange*) explained the world's first true 3D full color display. The DepthCube™ 3D display is a solid state multi-planar volumetric system in which a DLP based high speed projector projects slices of the 3D scene onto a stack of LC scattering shutters acting as an electronically controlled projection volume. An impressive demo with 15.3 million voxels and 110 nit brightness was shown outside the conference room during breaks.

J. Pirs (*Josef Stefan Institute, Slovenia*) discussed LCD light shutters for personal protection application. Fast switching, very high light attenuation, low optical distortion and low power consumption are required. A dedicated driving concept with relatively high voltages, yet a low residual DC voltage, and a highly symmetric twist LC configuration are applied.

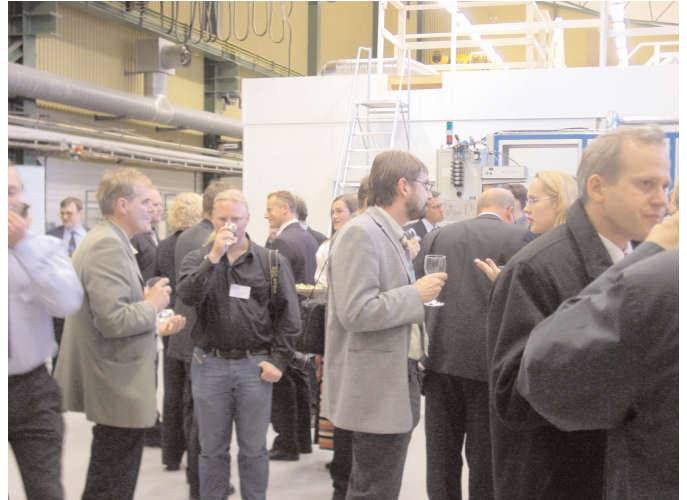
P. Andersson (*Linköping University*) presented several approaches for paper electronics and electronic paper. The examples included an organic active matrix addressed electrochromic display on paper and a switchable optical polarizer based on electrochromism. The devices operate at low voltages and can be made using printing techniques on rough surfaces but are relatively slow.

J. Stumpe (*Institut für Angewandte Polymerforschung, Golm, Germany*) talked about light induced orientation of liquid crystalline functional polymers. The irradiation of azobenzene containing polymers with resonant Ar-laser light results in the induction of bulk gratings based on the orientation effect and the formation of surface relief gratings. Gratings with a period of 0.3 – 15 micrometer and a high of 1.2 micrometer can be made.

Exhibition, Posters, Visit to the display research laboratory at the Swedish LCD center, and of course the Conference dinner.

The meeting also included an exhibition featuring products

from the "Crystal valley" such as welding helmets, and some posters on electronic paper and functional organic materials. This enlarged the view on the regional activities and stimulated contacts during breaks. A lively cocktail reception was hosted at the display prototype facility at the Swedish LCD center (see photo).



The cocktail reception near the clean room facility of the Swedish LCD center

This clean room facility, built inside a former heavy industry hall, shows the increasing regional activity in the high tech industry. A fruitful combination of "old" and "new". This experience was continued at the conference dinner organized in a restaurant located in a beautiful ancient building in the city of Falun. The excellent meal was accompanied by a traditional Swedish music performance. The noise level in between courses clearly illustrated the stimulating atmosphere with enthusiastic discussions while making new acquaintances.

SID-MEC General Meeting

Early the next morning J. Kimmel (*European officer of the SID*) , N. Fruehauf (*chair*) and F. Rochow (*treasurer*) headed the SID-MEC General Meeting, where the activities of the Chapter were reported.

With about 550 members the SID-ME chapter is the second largest chapter. The continuous healthy financial situation of the Chapter was explained. Also the installation of a SID-ME Student Award to acknowledge and highlight relevant display work by its members was announced.

Further, the election of the officers of the SID-ME chapter at the next Spring meeting was announced, and a call for officers was placed. The Spring'04 meeting is to be held on 25 and 26 of March in Frankfurt (see further information below).

Session 3 October 7 morning

J. Osterman (*Dalarna University*) discussed optical modes for

single-polarizer reflective bistable nematic displays. By eliminating the rear polarizer the brightness of the display can be significantly increased. The maximum achievable reflection is about 40% with a contrast ratio of about 20. Optical mode modeling increases the level of understanding and is valuable when considering this type of devices for practical application. Smirnov (Belarusian State University) presented a talk on design and fabrication of a LCOS microdisplay for near-to-the-eye devices. Untwisted- or twisted-nematic modes optimized for desired application can be used. For all tested LCOS microdisplays a contrast of more than 100:1 and 16 gray levels provided by pulse width modulation were measured.

Session 4 October 7 morning

J. Birgersson (Dalarna University) presented results of a spectroscopic study of ordered dichroic molecules for display applications. A TOF-SIMS study of the conversion process of a lyotropic liquid crystal solution into a self organized molecular film shows the conversion for a 3000 Å film is complete in a few minutes and there are no residual ions.

S. Valyukh (National Academy of Science of Ukraine) explained a new method for measuring cell gap and twist angle of TN LCD. These parameters can be retrieved from measurements of the transmission of a single polarizer cell as a function of wavelength. The accuracy of the cell gap is $\pm 0.01 \mu\text{m}$.

Khan (Kent Displays Inc., USA) talked about recent advances in reflective cholesteric displays. Brightness levels have improved and can be as high 40% for reflectivity from a single layer. Typical CTLC applications aim at signage or electronic book type displays. Some nice looking demos were shown. Reflective bright full color requires a stacked structure and an active matrix. In that case the reflection is about 35% and the color gamut is much smaller than for transmissive LCD.

J. Hautanen. (Nokia Research Center, Finland) talked about options and requirements for flexible displays for future mobile communication in the last paper of this meeting. Durable, conformable, bendable and rollable displays can be considered for the increasingly distant future. Several technologies have their specific advantages/disadvantages. However it should be noted that, cost and reliability are very demanding in the mobile market.

Crystal Valley visits

In conjunction with this SID-ME meeting there was an opportunity to visit two LC-industry firms, LC-Tec Displays AB and LC-Tec Automation AB, in the afternoon of October 7. These are start-up like firms, that employ about 30 people, and than

can manufacture display manufacturing equipment or specific displays according to customer specification. For instance, CTLC displays for 3D or signage application are made. These visits were appreciated very much by the participants and contribute much to the coherence of the display community.



An example of a CTLC signage display made in LC-Tec

Closing remarks

The Fall '03 SID MID-Europe meeting was a well-organized conference in a beautiful Swedish autumn setting, with a well balanced mix of science, technology and industrial application. An inspiring "Crystal Valley" experience.

Gerrit Oversluizen



SOCIETY FOR INFORMATION DISPLAY

Coming Event: SID-ME spring meeting 2004, With the SID-MEC General Meeting.

March 25-26, 2004

At Covion, Höchst Industrial Park, Frankfurt/Main, Germany

Special topic:
OLED display technology and applications

Visit the website for latest information:
<http://www.sid.org/chapters/me.html>

SID-ME Chapter committee elections

The candidates for officer positions of the SID-ME chapter at the Spring'04 Meeting committee elections in Frankfurt are as follows.

Chair: *Kent Skarp, Director of the Swedish LCD center (new).*

Vice chair: *Gerrit Oversluizen, Philips Research (continued).*

Treasurer: *Jutta Rasp, LCD Marketing manager of Europe DPT(new).*

Secretary: *Herbert De Smet, Ghent University (new).*

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SID-ME Chapter Student Award

Details will be announced at the spring'04 meeting and the following newsletter.

SID-ME Chapter committee.

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SID payment.

The SID annual membership fee amounts US\$ 75. Please note that the membership is now a rolling membership, which means that it runs 12 months from the month in which the payment was made. For more information see the SID website www.sid.org.

We encourage our members to pay directly to SID-HQ in the USA, but if they want to pay to the ME-Chapter directly the annual fee should be EUR 90 with all bank fees covered by the member !

In case of direct payment to the SID-ME Chapter the payment in EURO should be done to

Account no.: 206 020 1104
at: Berliner Sparkasse, Berlin, Germany
Bank code: BLZ 100 500 00
Account name: Frank Rochow, SID-ME

Please indicated your name on the remittance papers.

The Newsletter.

If you want to place an article in the Newsletter, which is interesting for the European display society, please send it to: G. Oversluizen, fax: +31 40 274 4335, E-mail: gerrit.oversluizen@philips.com