on (inorganic) semiconductor diodes, which are mode stabilized using distributed feedback (DFB) structures. Generally, lasers based on the DFB principle operate at a single fixed wavelength. Tunability of the laser wavelength would, however, be a desirable feature for e.g. multiplexing. Organic materials as the active component in solid state laser devices have received some attention of late. This is mainly due to the ease of processing these materials, which allows for solution processing (spin coating or printing), and their mechanical flexibility, which has been exploited to achieve flexible, however not tunable, laser resonator structures. We employ a novel elastomer that bears photo-reactive thiocyanate (-SCN) groups. These groups undergo a photo-induced isomerization to iso-thiocyanate (-NCS) under UV irradiation. This isomerization engenders an increase of the refractive index of the bulk material. Using interference lithography, we are able to inscribe refractive index gratings into a film of the material. With an organic laser dye as the active medium optically pumped lasers are fabricated. Elongating the structure leads to a change of the grating period with ensuing change of the emission wavelength. This allows for a continuous tuning of the laser wavelength over a spectral region of 25 nm.

P-FKP16: On the current domain picture of the microwave induced zero-resistance of high mobility quantum Hall systems

M. Oswald[1], J. Oswald[1]

[1] Institute of Physics, University of Leoben, 8700 Leoben, Austria

The experimental discovery of a microwave induced zero resistance state of high mobility two-dimensional electron systems [1] initiated a large number of theoretical papers. A frequently used picture [2] proposes microwave induced current domains of opposite dissipation-less current flow. We simulate this picture with a network model for magneto transport which was successfully used for modeling the integer quantum Hall effect [3]. For the plateau regime this model gives exact quantization of Rxy and zero-resistance of Rxx, which means dissipation-less current transport, even for macroscopically wide edge stripes. On this background we map out the current domains on the edge stripe picture. Within an edge stripe the top Landau level is half filled and hence we expect this as a suitable situation for representing current domains in the bulk. However, half filling in the bulk leads usually to the ohmic behavior in the plateau transition regime. This apparent contradiction is resolved by introducing an artificial domain wall by dividing the sample along the current flow and suppressing the coupling between these two regions. With this domain wall the whole potential drop appears close to the current contacts while the Hall voltage remains unchanged. For voltage probes far from the current contacts this results in a vanishing longitudinal resistance. Without domain wall the lateral potential drop occurs linearly over the sample length like for an ohmic conductor.

[1] R Mani et al, Nature 420, 646 (2002)
[2] A.V. Andreev et al, cond-mat/0302063
[3] Oswald et al, Physica E 11, 310 (2001)