



Monte Carlo modelling of electrooptical phenomena in nematic liquid crystals and polymers

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NLC - (Lebwohl-Lasher hamiltonian+Rapini potential)

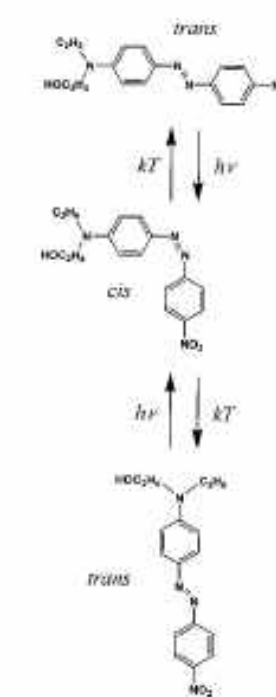
$$H = - \sum_{\langle r, r' \rangle} P_2[\cos(\vec{r}, \vec{r}')] - \sum_r E^2(\vec{r}) P_2[\cos(\vec{r})] + \sum_{r_w} \sin^2(\vec{r}_w)$$

Monte Carlo (Metropolis)

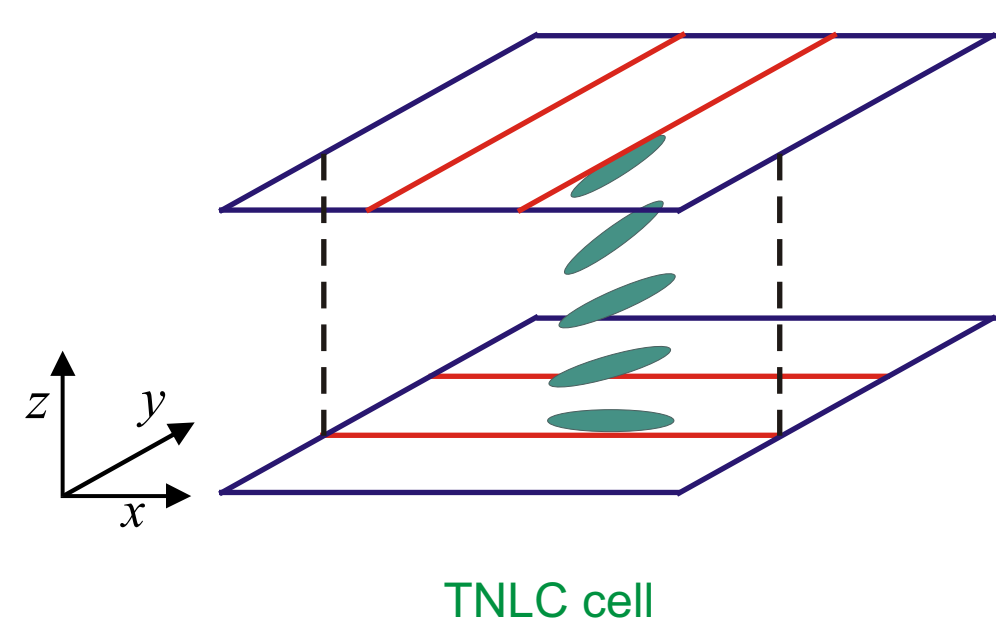
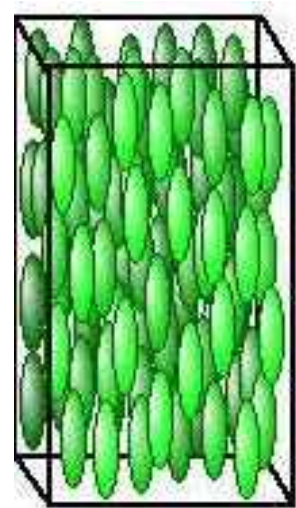
Lattice models

Polymers - Bond fluctuations method

Dumont model trans-cis photoisomerization

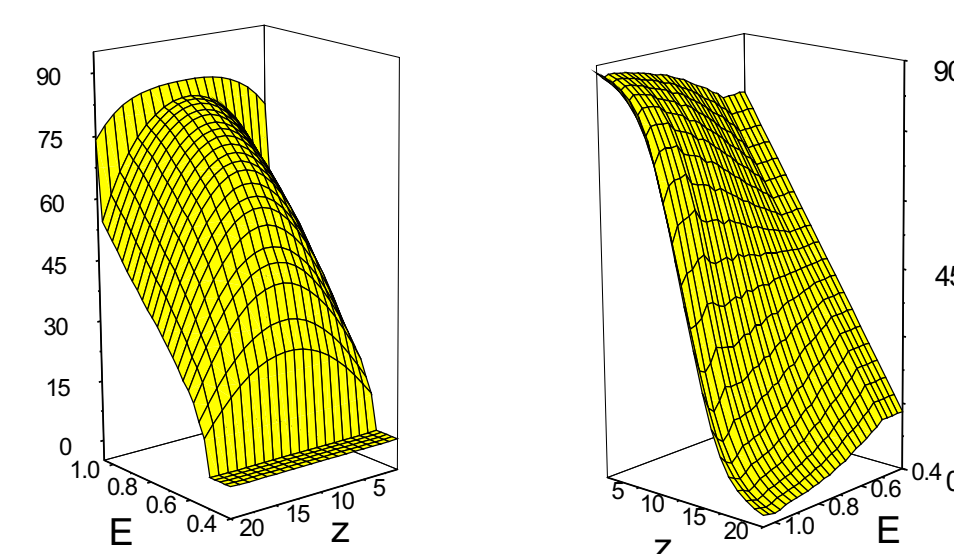


Nematic Liquid Crystals

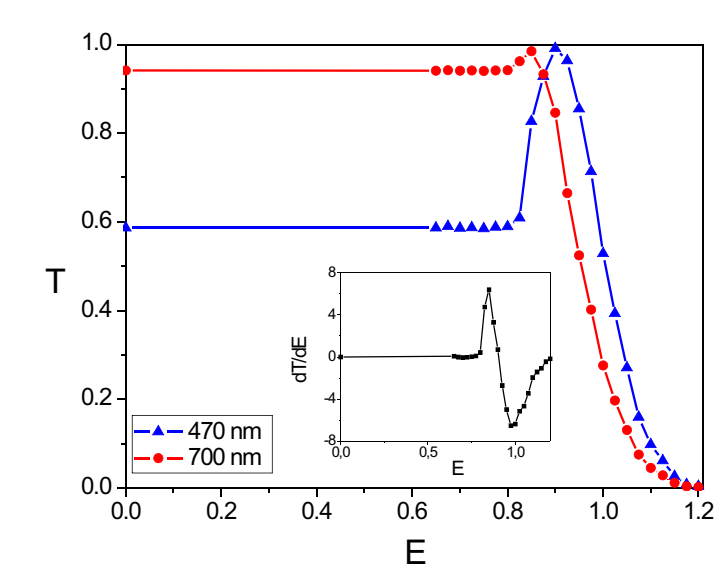


Role of anchoring forces : twisted NLC

Profiles of tilt and twist angles of director as a function of the applied voltage

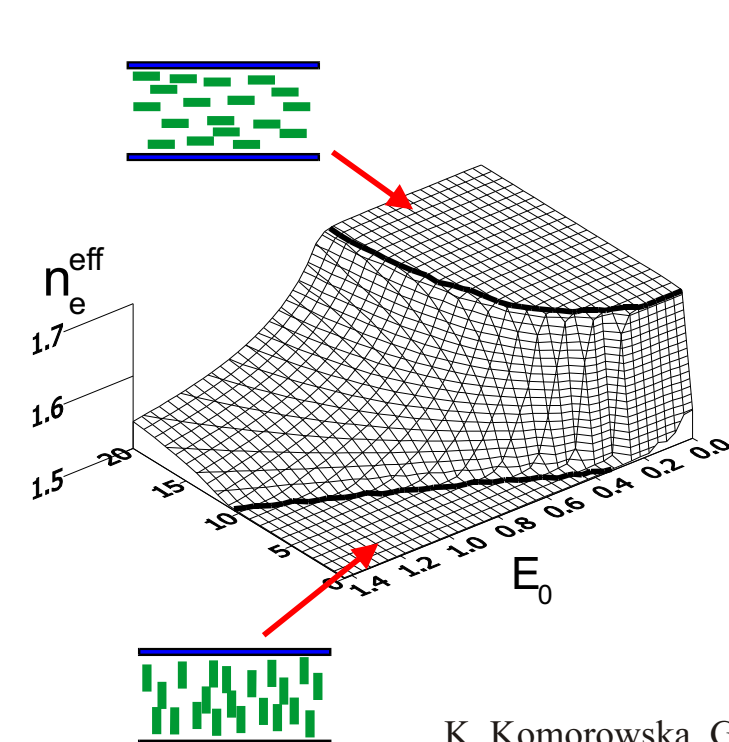


Transmission vs electric field

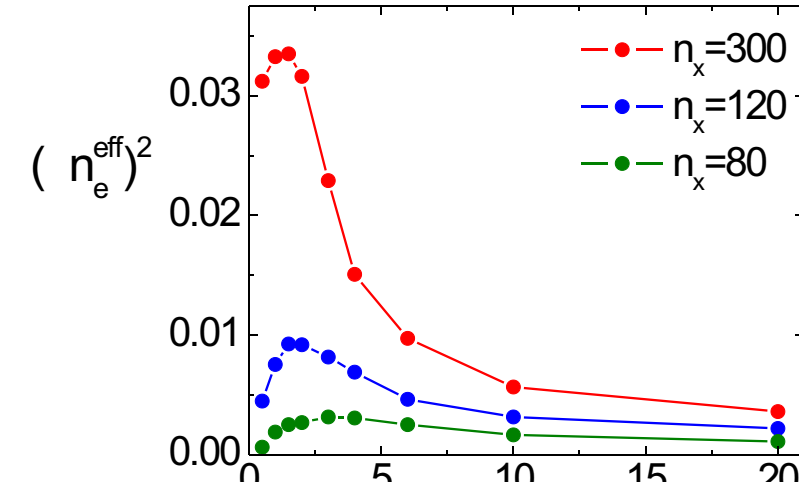


G. Pawlik, A. C. Mitsuś, F. Kajzar, *Proc. SPIE Int. Soc. Opt. Eng.* (2000) in press.

Checker-board hypothesis

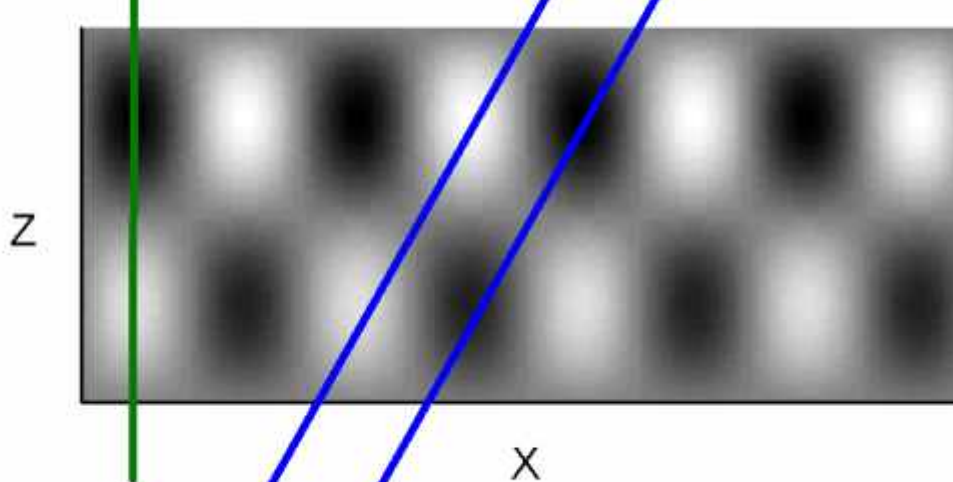


Diffraction efficiency

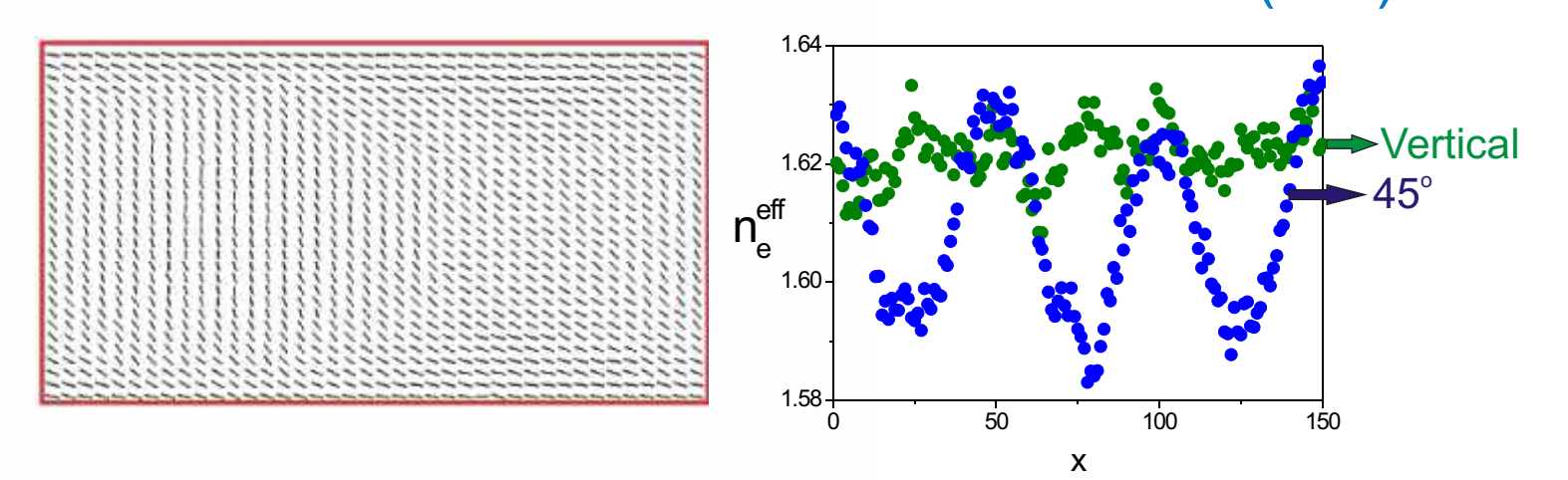


K. Komorowska, G. Pawlik, A. C. Mitsuś, A. Miniewicz, *J. Appl. Phys.* **90**, 1836 (2001).

Refractive index map (Miniewicz)



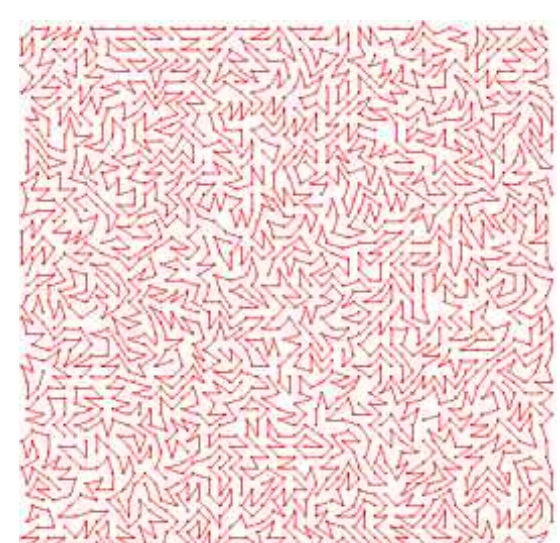
Refractive index (MC)



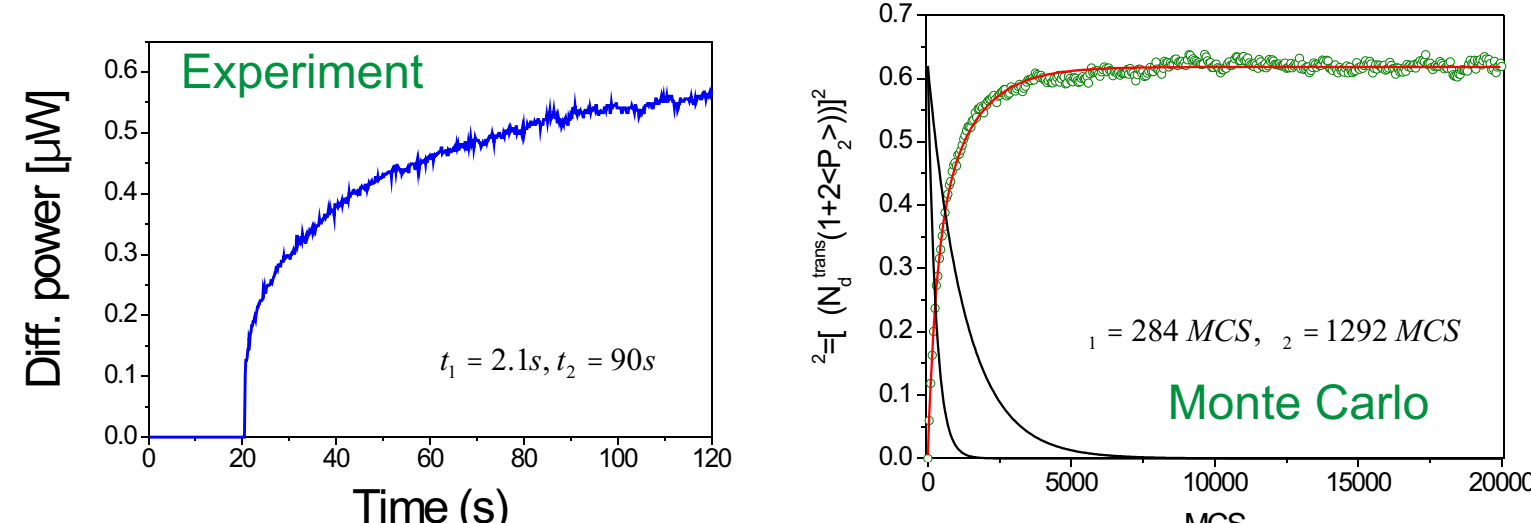
G. Pawlik, A. C. Mitsuś, A. Miniewicz, *Opt. Commun.* **182**, 294 (2000).

Polymers

Kinetic model of temperature-dependent writing and erasure of diffraction gratings

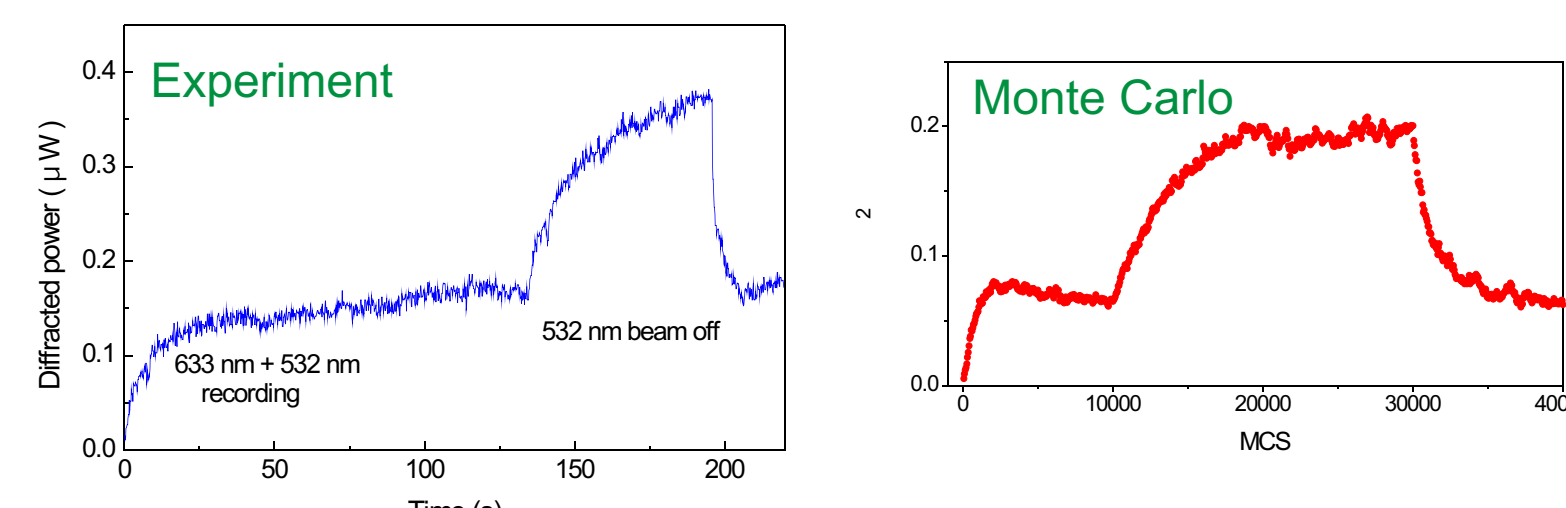


Two-exponential kinetics
Slow and quick processes

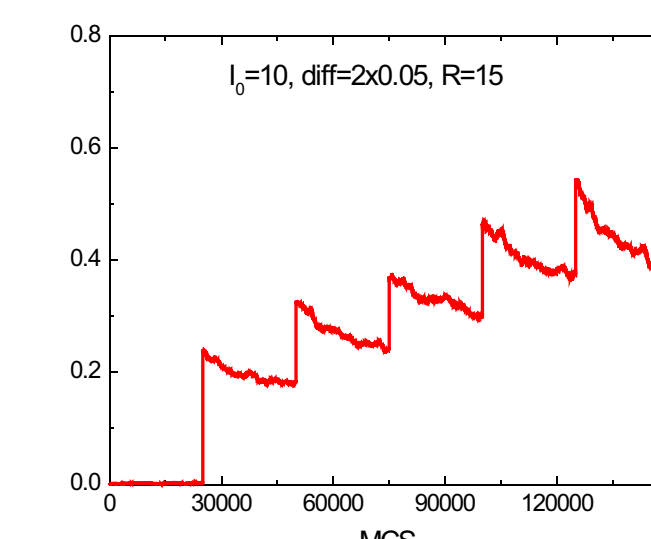


$$I(t) = I_0 - a e^{-t/\tau_1} - b e^{-t/\tau_2}$$

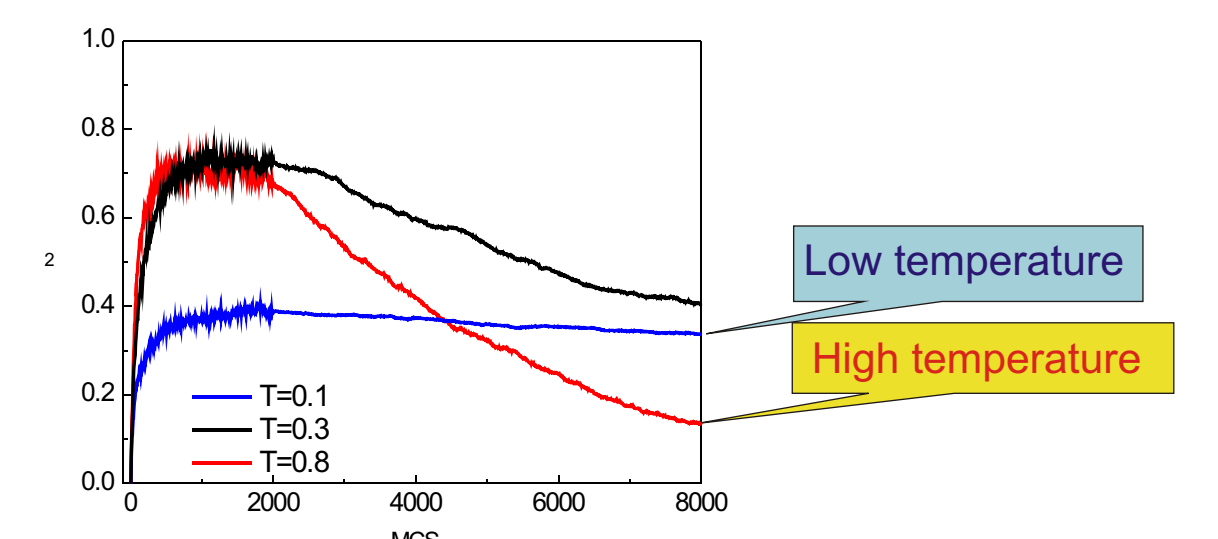
Offset effects



Pulsed writing of diffraction grating



Temperature effects for diffraction efficiency



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A. C. Mitsuś, G. Pawlik, A. Miniewicz, A. Sobolewska, F. Kajzar, *Proc. SPIE Int. Soc. Opt. Eng.*, **5517**, 207 (2004).
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