

Abstract Submitted
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Chaos near the onset of electroconvection of a homeotropic nematic liquid crystal¹ SHENG-QI ZHOU, GUENTER AHLERS, Dept. of Physics and IQCD, University of California, Santa Barbara — We report on shadow-graph measurements of spatio-temporal chaos patterns of electro-convection in the homeotropically aligned nematic liquid crystal MBBA. The cell had a thickness of $27 \mu\text{m}$ and a conductivity of $7.3 \times 10^{-8} (\Omega\text{m})^{-1}$. An AC voltage of amplitude V and frequency f with $20 \leq f \leq 200$ Hz was applied orthogonal to the cell plane. We found oblique (normal) rolls for $f < f_L$ ($f > f_L$) with $f_L \simeq 75$ Hz. From the structure factor (square of the modulus of the Fourier transform) of the images we determined a correlation length ξ (inverse half-width) and maximum S_0 . For small $\epsilon \equiv V^2/V_c^2 - 1 > 0$ fits of power laws to the results for ξ (S_0) yielded an exponent smaller (larger) than that predicted from Ginzburg-Landau equations. The departure from theory is similar to that found previously for domain chaos in rotating Rayleigh-Benard convection² and recent electro-convection measurements in a planar nematic liquid crystal.³

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²Y. Hu, R. E. Ecke and G. Ahlers, Phys. Rev. Lett. **74**, 5040 (1995).

³X.-C. Xu and G. Ahlers, unpublished.

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