

Meeting on Computational and Analytic Problems in Spectral Theory

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Abstract of Talk

THE WELL ORDER RECONSTRUCTION SOLUTION FOR NEMATIC LIQUID CRYSTALS

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We analyse a new well order reconstruction solution in the Landau-de Gennes theory for nematic liquid crystals in terms of a saddle-type critical point of an associated scalar variational problem. This solution was reported numerically in three-dimensional square wells, by Kralj&Majumdar in 2014. We prove the existence of this well order reconstruction solution, study its qualitative properties and prove that the solution loses stability for large wells, bifurcating into the more familiar diagonal and rotated solutions for large wells. In particular, we prove that this order reconstruction solution undergoes a supercritical pitchfork bifurcation in the scalar setting by a careful study of the second variation of the scalar energy. This is joint work with Samo Kralj, Giacomo Canevari, Amy Spicer, Martin Robinson, Chong Luo and Radek Erban.