

# Why gradient flows of some energies good for defect equilibria are not good for dynamics, and an improvement

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PIRE-CNA 2016 Summer School

- An augmented Oseen-Frank energy density is introduced with additional symmetries to deal with non-singular defects in NLC.
- The gradient flow dynamics of this energy is capable of recovering defect equilibria but it cannot deal with the physically expected dynamic behaviors.
- A dynamic model is introduced based on defect kinematics and thermodynamics. With this model, we explain the reasons why the gradient flow fails and an improvement is given.
- Various problems of slow defect dynamics are solved with this model, indicating its capability.