

Abstract Submitted  
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**Energetic Variational Approach to Multi-Component Fluid Flows**<sup>1</sup> ARKADZ KIRSHTEIN, Pennsylvania State Univ, CHUN LIU, Illinois Institute of Technology, JAMES BRANNICK, Pennsylvania State Univ — In this talk I will introduce the systematic energetic variational approach for dissipative systems applied to multi-component fluid flows. These variational approaches are motivated by the seminal works of Rayleigh and Onsager. The advantage of this approach is that we have to postulate only energy law and some kinematic relations based on fundamental physical principles. The method gives a clear, quick and consistent way to derive the PDE system. I will compare different approaches to three-component flows using diffusive interface method and discuss their advantages and disadvantages. The diffusive interface method is an approach for modeling interactions among complex substances. The main idea behind this method is to introduce phase field labeling functions in order to model the contact line by smooth change from one type of material to another.

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