



Contribution ID: 45

Type: **not specified**

Large Scale Simulations of Complex Systems

Wednesday, 20 December 2023 09:30 (10 minutes)

Complex systems refer to a class of interconnected entities or components whose collective behavior cannot be easily deduced from the properties of their individual parts. These systems are characterized by a high degree of interdependence, non-linear relationships, and emergent properties that arise from the interactions and feedback loops among the elements. Our primary focus will be on the dynamics of active fluids and active particles. While our research foundation is built on 2D systems, the expansion to 3D scenarios represents a pivotal leap. Despite the computational challenges posed by this transition, it allows us to scrutinize the emergence of self-propelled directed motion due to the coupling between induced flow and topological defects depending on specific anchoring. In this talk I'll give some updated on the development, tests, and validation we have performed on an optimized parallel Lattice Boltzmann (LB) solver specifically designed for simulating 3D multiphase active droplets.

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Session Classification: Lightning Talks