NSM
NATIONAL SUPERCOMPUTING MISSION

Workshop on

MicroSim

A powerful tool to simulate microstructure evolution using the Phase-Field technique

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Join our online workshop about the software, its structure and capabilities.
Learn how it can be used in research and industry.

JAN 22 • 10:00 AM TO 4:30PM

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EVENT STRUCTURE

10 AM | January 22, 2022

Introduction to MicroSim: Structure and capabilities of software, the phase-field models adopted, the higher performance computing possibilities and available discretizations (Time: 10AM - 11AM)

Break: 30 mins

Grand-potential finite-difference: Single phase dendritic solidification and binary eutectic solidification

Speaker : *Prof. Abhik Choudhury, IISc* (11:30AM - 12:30PM)

Break: 1 hr

KKS OpenCl: Single phase dendritic solidification and coupling with the thermodynamic databases

Speaker : *Dr. Dasari Mohan, IIT Bombay* (1:30PM - 2:30PM)

KKS-cuFFT: Precipitate growth and coarsening and the influence of elastic anisotropy

Speaker : *Prof. S. Bhattacharyya, IIT Hyderabad* (2:30PM - 3:30PM)

Cahn-Hilliard FFT: Precipitate growth and spinodal decomposition in a real alloy by coupling with the database

Speaker : *Prof. M. P. Gururajan, IIT Bombay* (3:30PM - 4:30PM)

CONTACT US

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MicroSim

(*Micro*structure *Sim*ulator)

MicroSim is a project under the National Supercomputing Mission, Govt of India. The project offers a set of codes that can use high-performance computing to simulate microstructure evolution using the Phase-Field technique. MicroSim is a software stack that consists of phase-field codes that offer flexibility with discretization, models as well as the high-performance computing hardware (CPU/GPU) that they can execute on. Along with this the stack also consists of Multi-physics solver modules that are based on OpenFoam and AMRex libraries (will be added soon). The stack has an integrator interface that is built using python that allows one to create the input and filling files required for the solvers as well as provides a consolidated framework to choose the solver, compile, execute and visualize simulation results. The project is developed and maintained by the consortium of researchers from IISc Bangalore, IIT Hyderabad, IIT Bombay, IIT Madras, Savitribai Phule Pune University, and C-DAC Pune. This is the first release of our phase-field software stack consisting of different phase-field models utilizing separate discretization strategies as well as the flexibility to run on different computing hardware (CPUs and GPUs). The phase-field models include the Grand-potential formalism, Kim-Kim Suzuki as well as the Cahn-Hilliard descriptions. The discretizations include FDM, FVM and FFT.

Microsim Repository | MicroSim V1.0.2

CONTRIBUTORS

- Tanmay Dutta, Ravi Kumar, Birkamjit Karmakar, Umate Kartik (IISc, Bangalore) (OpenFoam solvers and documentation)
- Ajay Sagar (IISc, Bangalore) (Python wrapper and infile generator)
- Dasari Mohan, M.P. Gururajan, Gandham Phanikumar (IIT Bombay, IIT Madras) (KKS OpenCl and FFTW codes)
- Saurav Shenoy, Pankaj and S. Bhattacharyya (IIT Hyderabad) (KKS Nvidia-CUDA)
- Abhik Choudhury (IISc, Bangalore) (Grand-potential based solvers)