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A Multi-Scale Cubic EOS Framework for Use in Reservoir Simulation

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2:15 p.m.
101 Goergen Hall

A new multi-scale equation of state (EOS) framework for multi-component, multi-phase equilibrium flash calculations, which uses information at the molecular and bulk fluid length scales, is described. The principle idea that underlies our multi-scale approach is to use the Gibbs-Helmholtz equation to constrain the energy parameter in the SRK equation. This gives rise to a novel up-scaling equation that relates information at the molecular and bulk fluid phase length scales and requires internal energies of departure, which can be easily computed using NTP Monte Carlo simulations. We call the resulting cubic EOS the Gibbs-Helmholtz Constrained (or GHC) equation.

In this presentation, I will present many of the underlying ideas using examples from an interdisciplinary project in fully compositional and thermal reservoir simulations for enhanced oil recovery (EOR).