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Simulating Cosmic Structure Formation

Friday, February 26, 2016 10:45 AM (30 minutes)

Numerical simulations on supercomputers play an ever more important role in astrophysics. They have become the tool of choice to predict the non-linear outcome of the initial conditions left behind by the Big Bang, providing crucial tests of cosmological theories. However, the problem of galaxy and star formation confronts us with a staggering multi-physics complexity and an enormous dynamic range that severely challenges existing numerical methods. In my
talk, I review current strategies to address these problems, focusing on recent developments in the field such as hierarchical time integration schemes, improved particle- and mesh-based hydrodynamical solvers. I will also discuss a selection of current results and highlight
some challenges for the future.

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