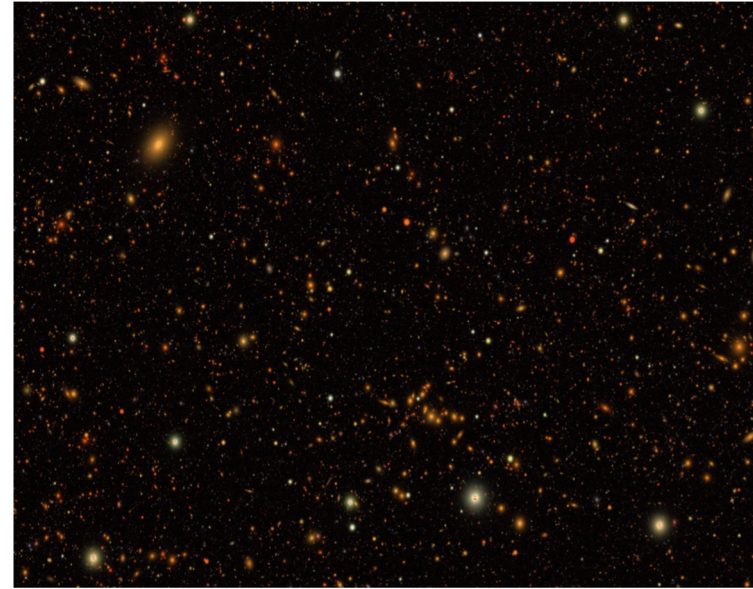


Significance of Simulation Development

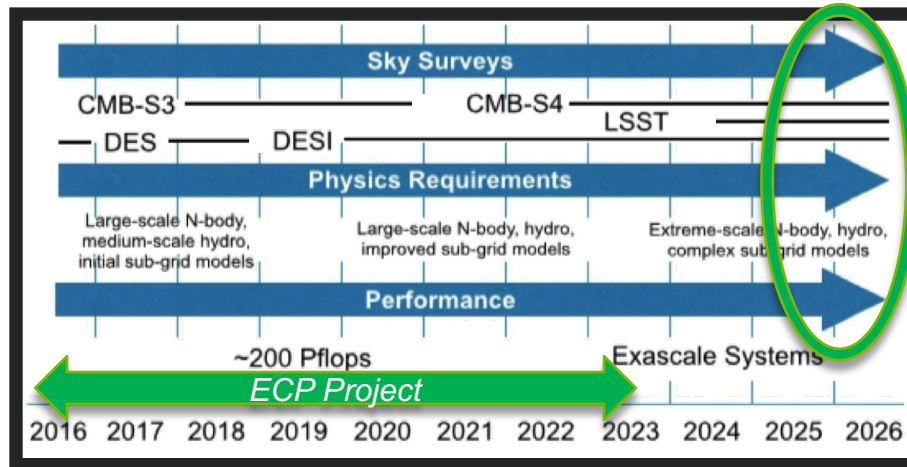
- **Simulations** are an essential component of Cosmic Frontier observations
 - Provide theoretical predictions and constraints for cosmic probes including cross-correlations
 - Characterize systematics necessary for the planning, calibration and validation of surveys
- **Enhanced Modeling** is important to match the sensitivities of future experiments
 - Baryonic effects, Astrophysical Processes, Neutrinos, etc.
 - New exascale supercomputers are arriving, allowing us to significantly expand the complexity and science reach of simulations
 - Over the next decade, post-exascale architectures will provide even more opportunities. But will we be able to use them?



*Simulated Sky Image
LSST DESC DC2 Team*

Significance of Simulation Development Cont.

- **Computational Readiness** is required to fully utilize the next era of computing
 - The landscape of compute facilities is changing (most notably with accelerators) and there is no indication that we are reaching a stability point beyond exascale
 - The compute and data accumulation/analysis requirements of observations are growing
 - Exascale Computing Project (ECP) and SciDAC program are a good examples of the success and importance of supporting scientific codes to effectively run on new machines
- **Supporting** simulation research will be critical to the success of future surveys



What models and compute requirements are needed for the next decade in Cosmic Frontier research?

What will machines look like in the post exascale era and will we be ready to use them for science?