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Computing the universe: how large-scale simulations illuminate galaxies and dark energy

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High-performance and large-scale computing is absolutely to understanding astronomical objects such as stars, galaxies, and the cosmic web. This is because these are structures that operate on physical, temporal, and energy scales that cannot be reasonably approximated in the laboratory, and whose complexity and nonlinearity often defies analytic modeling. In this talk, I show how the growth of computing platforms over time has facilitated our understanding of astrophysical and cosmological phenomena, focusing primarily on galaxies and large-scale structure in the Universe.