

MAR11-2010-020236

Abstract for an Invited Paper
for the MAR11 Meeting of
the American Physical Society

Computational Physics' Greatest Hits

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The digital computer, has worked its way so effectively into our profession that now, roughly 65 years after its invention, it is virtually impossible to find a field of experimental or theoretical physics unaided by computational innovation. It is tough to think of another device about which one can make that claim. In the session “What is computational physics?” speakers will distinguish computation within the field of computational physics from this ubiquitous importance across all subfields of physics. This talk will recap the invited session “Great Advances...Past, Present and Future” in which five dramatic areas of discovery (five of our “greatest hits”) are chronicled: The physics of many-boson systems via Path Integral Monte Carlo, the thermodynamic behavior of a huge number of diverse systems via Monte Carlo Methods, the discovery of new pharmaceutical agents via molecular dynamics, predictive simulations of global climate change via detailed, cross-disciplinary earth system models, and an understanding of the formation of the first structures in our universe via galaxy formation simulations. The talk will also identify “greatest hits” in our field from the teaching and research perspectives of other members of DCOMP, including its Executive Committee.