

Distinguished Lecture for HKSIAM and Hong Kong Universities

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Construction of Solution Landscape and Its Applications

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Abstract

Energy landscape has been widely applied to many physical and biological systems. A long standing problem in computational physics is how to search for the entire family tree of possible stationary states on the energy landscape without unwanted random guesses? Here we introduce a novel concept “Solution Landscape”, which is a pathway map consisting of all stationary points and their connections. We develop a generic and efficient saddle dynamics method to construct the solution landscape, which not only identifies all possible minima, but also advances our understanding of how a complex system moves on the energy landscape. We then apply the solution landscape approach to study two problems: One is construction of the defect landscapes of confined nematic liquid crystals, and the other one is to find the transition pathways connecting crystalline and quasicrystalline phases.



Biography

Professor Pingwen Zhang is a Professor in School of Mathematical Sciences, Peking University. He was elected as Academician of Chinese Academy of Sciences in 2015, and Fellow of Society for Industrial and Applied Mathematics (SIAM) in 2020. He is President of China Society for Industry and Applied Mathematics (CSIAM), and Vice President of Peking University. He has made tremendous contributions in complex fluids modeling, multiscale analysis, and adaptive grid computation. He is the Editor in Chief of CSIAM Transactions on Applied Mathematics. He is an Invited Speaker of International Congress of Mathematicians (ICM) 2018, and an Invited Speaker of International Congress on Industrial and Applied Mathematics (ICIAM) 2011. He received Feng Kang Prize of Scientific Computing in 1999, and National Prize of Natural Sciences of China (Second-prize) in 2014.

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Time:

3pm – 4pm

Venue:

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