力学所青促会青年创新论坛

报告题目：Understanding Water Ice: Ten Weird Facts

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Key Learning Point

—Cooperative relaxation and polarization of the asymmetrically coupled O:H—O oscillator pair amazing water ice

报告人简介：Received his PhD in Physics at Murdoch University in 1996 and then joined NTU to date, Dr Sun has been working on the themes of Chemisorption, Solvation, Nano-Physics, Multifield Single-bond Mechanics, and Water Ice with attainments featured in three monographs and multiple treatises featured in Chem Rev, Surf Sci Rep, Prog Mater Sci., etc. .

报告摘要：As the source and central part of all life, the simple substance, water ice (H2O), bends the rules - it is too strange, too anomalous, and too challenging. Ideas in terms of continuum thermodynamics, molecular dynamics, or structural order configuration could hardly explain completely the weird facts that one can observe. From the perspective of hydrogen bond (O:H—O) cooperativity and polarizability, we have reconciled the mysteries of water ice subjecting to mechanical compression, thermal stimulation, molecular undercoordination, and electromagnetic excitation. Here we share understanding of ten typical facts: ice floating, ice regelation, ice friction, “instant” icing, nanobubble stability, water's tough skin, salt ice melting, floating water bridge, frog maglev, and the Mpemba paradox - warmer water cools faster. As the basic structural and energy-exchange unit, the O:H—O bond cooperative relaxation in length and energy rules the weirdness of water ice.

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5. Y.L. Huang, X. Zhang, Z.S. Ma, Y.C. Zhou, W.T. Zheng, J. Zhou, and C.Q. Sun, Hydrogen-bond relaxation dynamics: Resolving mysteries of water ice. Coord Chem Rev, 285: 109-165, (2015).
6. X.J. Liu, M.L. Bo, X. Zhang, L. Li, Y.G. Nie, H. TIan, Y. Sun, S. Xu, Y. Wang, W. Zheng, and C.Q. Sun, Coordination-resolved electron spectrometrics. Chem Rev, 115(14): 6746-6810, (2015).

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地点：力学所会议中心204会议室