nanoSeminar Series 2021

Institute for Materials Science

Professor Bo Song

School of Optical-Electrical Computer Engineering, University of Shanghai for Science and Technology, Shanghai, China

“Quantum physics, Biology and Neuroscience”

Thursday, April 15th 2021
13:00 – 14:00

Normal: Seminar Room 115, Hallwachsstr. 3 (HAL)
Pandemic version: https://tinyurl.com/nanoSeminar-GA

400 years ago, Sir Isaac Newton proposed that the world is infinitely continuous and then created physics. 100 years ago, Planck discovered the discontinuity of the world, proposed quantum theory, and co-founded quantum mechanics with Einstein, Bohr, Schrödinger, Heisenberg, Dirac and others. It enables us to understand our world from the macroscopic to microscopic levels. Seventy years ago, Schrödinger, the founder of quantum mechanics, began to think about life from the perspective of physics: What is life? Ten years ago, quantum coherence was proposed in the photosynthesis system of plant. Later, it was believed that the dawn of quantum biology has arrived. Do the complex biological systems obey simple physical laws? Is the quantum biology really coming? Or is it still the long night before dawn? Still "a biological system is too complicated to find simple and clear physical laws".

[1] X. Liu, Z. Qiao, Y. Chai, Z. Zhu, K. Wu, W. Ji, D. Li, Y. Xiao, L. Mao, C. Chang*, Q. Wen*, B. Song* & Y. Shui*. Nonthermal and reversible control of neuronal signaling and behavior by midinfrared stimulation. *P. Natl. Acad. Sci. U.S.A.* **118**, e2015685118 (2021).
[2] N. Li, D. Peng, X. Zhang, Y. Shu, F. Zhang*, L. Jiang* & B. Song*. Demonstration of biophoton-driven DNA replication via gold nanoparticle-distance modulated yield oscillation. *Nano Res.* **14**, 40–45 (2021).
[3] B. Song* & Y. Shu. Cell vibron polariton resonantly self-confined in the myelin sheath of nerve. *Nano Res.* **13**, 38–44 (2020).
[4] Z. Zhu, C. Chang, Y. Shu & B. Song*. Transition to a superpermeation phase of confined water induced by a terahertz electromagnetic wave. *J. Phys. Chem. Lett.* **11**, 256–262 (2020).
[5] Z. Zhu, C. Chen, C. Chang & B. Song*. Terahertz-light induced structural transition and superpermeation of confined monolayer water. *J. Phys. Chem. Lett.* **8**, 781–786 (2021).

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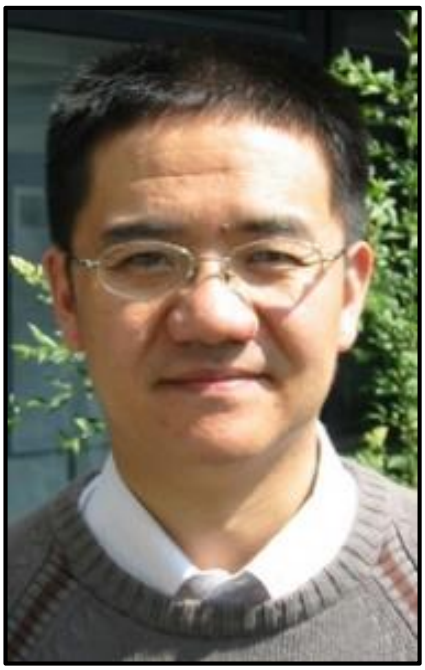

Prof. Song received his PhD in 2003 from Technical Institute of Physics and Chemistry, Chinese Academy of Science. In 2003-2008, he worked as a postdoctoral fellow with Prof. Wenjian Liu in Peking Unversity, and then with Prof. Giovanni Cuniberti in Regensburg University and Technical University of Dresden. In 2008, he joined Shanghai Institute of Applied Physics, Chinese Academy of Science. In 2016, he and his group moved to University of Shanghai for Science and Technology. His scientific interests focus on the quantum biology and neuroscience, terahertz effect on biological system, and bio-inspired designing of materials and devices.

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