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Research Summary:

I am interested in designing and developing the optical combination system based on ultrahigh vacuum and low temperature STM, thus in order to study the light-matter interactions in single molecules. Such as the current studies include single molecular plasmon-enhanced Raman scattering for identifying and resolving single porphyrin molecules with sub-nm spectral resolution, as well as the single carbon nanotubes, and electroluminescence photon source from single molecular STM junctions driven by the electric fields. My research interests include: UHV-STM, single-molecule spectroscopies (including tip-enhanced Raman spectroscopy, single-molecule electroluminescence), plasmonics, nano-optics.

Selected publications:

- **R. Zhang**, Y. Zhang, Z. C. Dong, S. Jiang, C. Zhang, L. G. Chen, L. Zhang, Y. Liao, J. Aizpurua, Y. Luo, J. L. Yang, and J. G. Hou, "Chemical mapping of a single molecule by plasmon enhanced Raman scattering", ***Nature*** 498, 82-86 (2013).
- C. Zhang, **R. Zhang**, S. Jiang, L. Zhang, H. Y. Gao, X. L. Zhang, L. G. Chen, Y. Liao, and Z. C. Dong, "Tip-plasmon mediated molecular electroluminescence on the highly oriented pyrolytic graphite substrate", ***Applied Physcis Letters*** 100, 073111 (2012).
- Liuguo Chen, Chao Zhang, **Rui Zhang**, and Zhenchao Dong, "Self-assembly of alpha-6T molecules on Ag (100) and related STM induced luminescence", ***Chinese Journal of Chemical Physics***, 2011.
- C. Zhang, B. Gao, L. G. Chen, Q. S. Meng, H. Yang, **R. Zhang**, X. Tao, H. Y. Gao, Y. Liao, and Z. C. Dong, "Fabrication of silver tips for scanning tunneling microscope induced luminescence", ***Review of Scientific Instruments*** 82, 083101 (2011).
- Z. C. Dong, X. L. Zhang, H. Y. Gao, Y. Luo, C. Zhang, L. G. Chen, **R. Zhang**, X. Tao, Y. Zhang, J. L. Yang and J. G. Hou, "Generation of molecular hot electroluminescence by resonant nanocavity plasmons", ***Nature Photonics***, 4, 50 (2010).