Xiang-Tian Kong

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PROFESSIONAL EXPERIENCE

Research Associate **AUGUST 2018 - JULY 2019**
Department of Chemistry, University of Washington, Seattle, WA
Supervisor: Prof. David J. Masiello

- Theoretically study electron energy loss spectroscopy (EELS), optical and thermal properties of plasmonic nanosystems
- Collaborate with several experimental groups
- Provide mentorship to junior graduate students

Postdoctoral Researcher **SEPTEMBER 2015 - JULY 2018**
Department of Physics and Astronomy, Ohio University, Athens, OH
Supervisor: Prof. Alexander O. Govorov

- Theoretically studied plasmonic hot electron generation and injection, plasmonic circular dichroism in chiral nanostructures, thermal properties of plasmonic system, optical emission and electron confinement in quantum dots, and plasmonic nanostructures with complex geometries
- Collaborated with several experimental groups

Postdoctoral Researcher **JUNE 2015 - JUNE 2018**
University of Electronic Science and Technology of China, Chengdu, China

- Collaborated with Prof. Alexander O. Govorov at Ohio University as a joint postdoctoral researcher under the supervision of Prof. Zhiming Wang at UESTC.

Postdoctoral Fellow **JULY 2013 - MAY 2015**
National Center for Nanoscience and Technology, Beijing, China

- Theoretically studied graphene plasmonic waveguides, resonant graphene nanostructures, and photonic crystals

EDUCATION

Ph.D. Physics **SEPTEMBER 2008 - JUNE 2013**
Nankai University, Tianjin, China
Dissertation: “Optical Properties of Sub-Diffraction Plasmonic Waveguides”

- Studied subwavelength plasmonic waveguides, multilayer systems containing graphene for sensing applications, and designed mode converters in plasmonic waveguides using transformation optics

B.S. Physics **AUGUST 2004 - JULY 2008**
Northeastern University, Shenyang, China

TECHNICAL SKILLS

- Theoretical modeling in nanophotonics
  - Plasmonic nanoparticles; plasmonic waveguides; multilayer systems
- Numerical simulations (using COMSOL, DDSCAT, FDTD)
  - Optical properties; generation of hot electrons; electronic states and optical emission in quantum dots; thermal properties of solid
- Programming (Matlab, Modern Fortran, Bash)

RESEARCH INTERESTS

- Optical and thermal properties of plasmonic nanostructures
- Computational electromagnetics
- Hot electrons generated by metal nanoparticles
- Circular dichroism and chiral plasmonic nanomaterials
- Graphene nanophotonics and graphene plasmonics
- Photoluminescence of quantum dots
- Transformation optics

PUBLICATIONS

34 peer-reviewed publications; *h*-index 14

1. Bhattacharjee, U.; West, C. A.; Jebeli, S. A. H.; Goldwyn, H. J.; Kong, X.-T.; Hu, Z.; Beutler, E. K.; Chang, W.-S.; Willets, K. A.; Link, S.; Masiello, D. J., Active Far-Field Control of the Thermal Near-Field via Plasmon Hybridization. **ACS Nano** *2019*, DOI: 10.1021/acsnano.9b04968
2. Kuhn, D. L.; Zander, Z.; Kulisiewicz, A. M.; Debow, S. M.; Haffey, C.; Fang, H.; Kong, X.-T.; Qian, Y.; Walck, S. D.; Govorov, A. O.; Rao, Y.; Dai, H.-L.; DeLacy, B. G., Fabrication of Anisotropic Silver Nanoplatelets on the Surface of TiO2 Fibers for Enhanced Photocatalysis of a Chemical Warfare Agent Simulant, Methyl Paraoxon. **J. Phys. Chem. C** *2019*, DOI: 10.1021/acs.jpcc.9b04026
3. Urban, M. J.;* Shen, C.;* Kong, X.-T.;* Zhu, C.; Govorov, A. O.; Wang, Q.; Hentschel, M.; Liu, N., Chiral Plasmonic Nanostructures Enabled by Bottom-Up Approaches. **Annu. Rev. Phys. Chem.** *2019*, 70(1), DOI: 10.1146/annurev-physchem-050317-021332 [*equal contributors]

4. Cushing, S. K.; Chen, C.-J.; Dong, C. L.; Kong, X.-T.; Govorov, A. O.; Liu, R.-S.; Wu, N., Tunable Non-Thermal Distribution of Hot Electrons in a Semiconductor Injected from a Plasmonic Gold Nanostructure. **ACS Nano** *2018*, DOI: 10.1021/acsnano.8b02939
5. Kong, X.-T.; Vazquez Besteiro, L.; Wang, Z.; Govorov, A. O., Plasmonic Chirality and Circular Dichroism in Bio-assembled and Non-biological Systems: Theoretical Background and Recent Progress. **Adv. Mater.** *2018*, DOI: 10.1002/adma.201801790
6. Tong, X.; Kong, X.-T.; Wang, C.; Zhou, Y.; Navarro-Pardo, F; Barba, D.; Ma, D.; Sun, S.; Govorov, A. O.; Zhao, H; Wang, Z. M.; Rosei, F., Optoelectronic Properties in Near-infrared Colloidal Heterostructured Pyramidal "Giant" Core/shell Quantum Dots. **Adv. Sci. (Weinheim, Ger.)** *2018*, DOI: 10.1002/advs.201800656
7. Vazquez Besteiro, L.; Kong, X.-T.; Wang, Z.; Rosei, F.; Govorov, A. O., Plasmonic Glasses and Films Based on Alternative Inexpensive Materials for Blocking Infrared Radiation. **Nano Lett.** *2018*, 18(5), 3147–3156.
8. Kong, X.-T.; Khosravi Khorashad, L.; Wang, Z.; Govorov, A. O., Photothermal Circular Dichroism Induced by Plasmon Resonances in Chiral Metamaterial Absorbers and Bolometers. **Nano Lett.** *2018*, 18 (3), 2001-2008.
9. Madathumpady Abubaker, H. M.; Lamers, M.; Baumann, V.; Dey, P.; Blanch, A. J.; Polishchuk, I.; Kong, X.-T.; Levy, D.; Urban, A. S.; Govorov, A. O.; Pokroy, B.; Rodríguez-Fernández, J.; Feldmann, J., Strong Quantum Confinement Effects and Chiral Excitons in Bio-Inspired ZnO−Amino Acid Cocrystals. **J. Phys. Chem. C** *2018*, 122 (11), 6348-6356
10. Negrín-Montecelo, Y.; Comesaña-Hermo, M.; Kong, X.-T.; Rodríguez-González, B.; Wang, Z.; Pérez-Lorenzo, M.; Govorov, A. O.; Correa-Duarte, M. A., Traveling hot-spots in plasmonic photocatalysis: Manipulating interparticle spacing for real-time control of electron injection. **ChemCatChem** *2018*, 10(7), 1867-3880.
11. Qin, Y.; Kong, X.-T.; Wang, Z.; Govorov, A. O.; Kortshagen, U. R., Near-Infrared Plasmonic Copper Nanocups Fabricated by Template-Assisted Magnetron Sputtering. **ACS Photonics** *2017*, 4 (11), 2881-2890.
12. Sykes, M. E.; Stewart, J. W.; Akselrod, G. M.; Kong, X.-T.; Wang, Z.; Gosztola, D. J.; Martinson, A. B. F.; Rosenmann, D.; Mikkelsen, M. H.; Govorov, A. O.; Wiederrecht, G. P., Enhanced generation and anisotropic Coulomb scattering of hot electrons in an ultra-broadband plasmonic nanopatch metasurface. **Nat. Commun.** *2017*, 8(1), 986.
13. Tong, X.; Kong, X.-T.; Zhou, Y.; Navarro-Pardo, F; Selopal, G. S.; Sun, S.; Govorov, A. O.; Zhao, H; Wang, Z. M.; Rosei, F., Near-Infrared, Heavy Metal-Free Colloidal “Giant” Core/Shell Quantum Dots. **Adv. Energy Mater.** *2018*, 8, 1701432.
14. Vazquez Besteiro, L.; Kong, X.-T.; Wang, Z.; Hartland, G. V.; Govorov, A. O., Understanding Hot-Electron Generation and Plasmon Relaxation in Metal Nanocrystals: Quantum and Classical Mechanisms. **ACS Photonics** *2017*, 4 (11), 2759-2781.
15. Kong, X.-T.; Zhao, R.; Wang, Z.; Govorov, A. O., Mid-infrared Plasmonic Circular Dichroism Generated by Graphene Nanodisk Assemblies. **Nano Lett.** *2017*, 17 (8), 5099-5105.
16. Yan, X.-Q.; Liu, F.; Kong, X.-T.; Yao, J.; Zhao, X.; Liu, Z.-B.; Tian, J.-G., Polarization dependence of graphene transient optical response: interplay between incident direction

and anisotropic distribution of nonequilibrium carriers. **J. Opt. Soc. Am. B** *2017*, 34 (1), 218-226.

17. Kong, X.-T.; Wang, Z.; Govorov, A. O., Plasmonic Nanostars with Hot Spots for Efficient Generation of Hot Electrons under Solar Illumination. **Adv. Opt. Mater.** *2017*, 5 (15), 1600594.
18. Sousa-Castillo, A.; Comesaña-Hermo, M.; Rodríguez-González, B.; Pérez-Lorenzo, M.; Wang, Z.; Kong, X.-T.; Govorov, A. O.; Correa-Duarte, M. A., Boosting Hot Electron-Driven Photocatalysis through Anisotropic Plasmonic Nanoparticles with Hot Spots in Au–TiO2 Nanoarchitectures. **J. Phys. Chem. C** *2016*, 120 (21), 11690-11699.
19. Kong, X.-T.; Khan, A. A.; Kidambi, P. R.; Deng, S.; Yetisen, A. K.; Dlubak, B.; Hiralal, P.; Montelongo, Y.; Bowen, J.; Xavier, S.; Jiang, K.; A. J. Amaratunga, G.; Hofmann, S.; Wilkinson, T. D.; Dai, Q.; Butt, H., Graphene-based ultrathin flat lenses. **ACS Photonics** *2015*, 2 (2), 200-207.
20. Kong, X.-T.; Bai, B.; Dai, Q., Graphene plasmon propagation on corrugated silicon substrates. **Opt. Lett.** *2015*, 40 (1), 1-4.
21. Yang, X.;* Kong, X.-T.;* Bai, B.; Li, Z.; Hu, H.; Qiu, X.; Dai, Q., Substrate phonon-mediated plasmon hybridization in coplanar graphene nanostructures for broadband plasmonic circuits. **Small** *2015*, 11 (5), 591-596. (*Equal contributors)
22. Yao, J.; Zhao, X.; Yan, X.-Q.; Kong, X.-T.; Gao, C.; Chen, X.-D.; Chen, Y.; Liu, Z.-B.; Tian, J.-G., Making transient optical reflection of graphene polarization dependent. **Opt. Express** *2015*, 23 (19), 24177-24188.
23. Gao, C.; Zhao, X.; Yao, J.; Yan, X.-Q.; Kong, X.-T.; Chen, Y.; Liu, Z.-B.; Tian, J.-G., Sign of differential reflection and transmission in pump-probe spectroscopy of graphene on dielectric substrate. **Photon. Res.** *2015*, 3 (2), A1-A9.
24. Kong, X.-T.; Butt, H.; Yetisen, A. K.; Kangwanwatana, C.; Montelongo, Y.; Deng, S.; Cruz Vasconcellos, F. d.; Qasim, M. M.; Wilkinson, T. D.; Dai, Q., Enhanced reflection from inverse tapered nanocone arrays. **Appl. Phys. Lett.** *2014*, 105 (5), 053108.
25. Kong, X.-T.; Yang, X.; Li, Z.; Dai, Q.; Qiu, X., Plasmonic extinction of gated graphene nanoribbon array analyzed by a scaled uniform Fermi level. **Opt. Lett.** *2014*, 39 (6), 1345-1348.
26. Kong, X.-T.; Li, Z.-B.; Tian, J.-G., Mode converter in metal-insulator-metal plasmonic waveguide designed by transformation optics. **Opt. Express** *2013*, 21 (8), 9437-9446.
27. Ye, Q.; Wang, J.; Liu, Z.; Deng, Z.-C.; Kong, X.-T.; Xing, F.; Chen, X.-D.; Zhou, W.-Y.; Zhang, C.-P.; Tian, J.-G., Polarization-dependent optical absorption of graphene under total internal reflection. **Appl. Phys. Lett.** *2013*, 102 (2), 021912-4.
28. Yan, W.-G.; Kong, X.-T.; Li, Z.-B.; Tian, J.-G., Nanostructure Fabricated by Nanosphere Lithography Assisted with O_2 Plasma Treatment. **J. Nanoscience Nanotech.** *2013*, 13 (6), 4311-4315.
29. Yan, W.-G.; Ying, C.-F.; Kong, X.-T.; Li, Z.-B.; Tian, J.-G., Fabrication and optical properties of inclined Au nanocup arrays. **Plasmonics** *2013*, 8 (4), 1607-1611.
30. Kong, X.-T.; Yan, W.-G.; Li, Z.-B.; Tian, J.-G., Optical properties of metal-multi-insulator-metal plasmonic waveguides. **Opt. Express** *2012*, 20 (11), 12133-12146.

31. Xing, F.; Liu, Z.-B.; Deng, Z.-C.; Kong, X.-T.; Yan, X.-Q.; Chen, X.-D.; Ye, Q.; Zhang, C.-P.; Chen, Y.-S.; Tian, J.-G., Sensitive real-time monitoring of refractive indexes using a novel graphene-based optical sensor. **Sci. Rep.** *2012*, 2, 908.
32. Li, Z.-B.; Zhou, W.-Y.; Kong, X.-T.; Tian, J.-G., Polarization dependence and independence of near-field enhancement through a subwavelength circle hole. **Opt. Express** *2010*, 18 (6), 5854-5860.
33. Li, Z.-B.; Yang, Y.-H.; Kong, X.-T.; Zhou, W.-Y.; Tian, J.-G., Fabry–Perot resonance in slit and grooves to enhance the transmission through a single subwavelength slit. **J. Opt. A: Pure Appl. Opt.** *2009*, 11 (10), 105002.
34. Li, Z.-B.; Yang, Y.-H.; Kong, X.-T.; Zhou, W.-Y.; Tian, J.-G., Enhanced transmission through a subwavelength slit surrounded by periodic dielectric bars above the metal surface. **J. Opt. A: Pure Appl. Opt.** *2008*, 10 (9), 095202.

PRESENTATIONS

6 oral presentations including 1 invited talk

1. Oral presentation. Xiang-Tian Kong, Zhiming Wang, Alexander Govorov, "Design of in-plane graphene metasurfaces for generating strong mid-infrared circular dichroism". **2018 APS March Meeting**, H12.00002, Los Angeles, California (March 5-9, 2018)
2. Oral presentation. Xiang-Tian Kong, Zhiming Wang, Alexander Govorov, "Hot Electrons Generated by Nano-Gap Plasmons in the Near-Infrared Spectral Interval". **2017 MRS fall meeting and exhibition**, NM06.11.06, Boston, MA (November 26 - December 1, 2017).
3. *Invited*. Xiang-Tian Kong, Zhiming Wang, Alexander O. Govorov, "Generation of Hot Electrons Using Plasmonic Nanostars for Photocatalysis". **XXVI International Materials Research Congress 2017**, SB.3-O003, Cancun, Mexico (August 19-25, 2017).
4. Oral presentation. X.-T. Kong, R. Zhao, Z. Wang, A. O. Govorov, "Strong Mid-Infrared Circular Dichroism Generated by Graphene Nanodisk Assemblies". **XXVI International Materials Research Congress 2017**, SA.3-O015, Cancun, Mexico (August 19-25, 2017).
5. Oral presentation. Xiang-Tian Kong, "Strong Mid-Infrared Circular Dichroism Generated by Graphene Nanodisk Assemblies". **Ohio University Postdoctoral Symposium 2017**, Athens, OH (April 26, 2017).
6. Oral presentation. Xiang-Tian Kong, Zhiming Wang, Alexander Govorov, "Generation of Hot Electrons Using Plasmonic Nanostars". **2016 MRS fall meeting and exhibition**, EM7.3.02, Boston, MA (November 27 - December 2, 2016).

TEACHING

1. Spring 2017 (March 13, 15, 17), Thermal Physics, Phys3011/5011, Clippinger Hall 131, Ohio University
2. Fall 2017 (September 21 -- 28), Analytical Mechanics, Phys411, Clippinger Hall 132A, Ohio University

3. Spring 2018 (January 19, 23, 25, 26) Electrodynamics, Phys6031, Clippinger Hall 132A, Ohio University

REFERENCES

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Prof. Alexander O. Govorov

Distinguished professor, APS Fellow

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Prof. Zhiming Wang

Professor

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