CV of Jau Tang

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Citizenship: USA

Recent research fields:

- 4D electron microscopy of photoinduced carrier dynamics, structural dynamics, phase transitions in metallic, semiconductor and carbon-based nanomaterials.
- Nanoscience and Nanotechnology： Photoluminescence of Semiconductor and Metallic Nanoparticles; Confocal/AFM Single Molecule Spectroscopy; Quantum Dot Lasers; Quantum Dot Single-Photon Sources; Plasmonics;
- Photophysics & Photochemistry： Femtosecond-Laser Induced Ultrafast Phenomena; Time-Resolved Electron/X-ray Diffraction of Nanomaterials; Photo-Induced Electron Transfer in Natural and Artificial Photosynthesis; Photovoltaics;
- Nonlinear Fiber Optics Lightwave System and DWDM Transmission System Designs; Information Theory of Shannon Channel Capacity;

Education

- University of California, Berkeley; Ph.D. Physics, 1981, "Study of correlated motion by multiple quantum nuclear magnetic resonance spectroscopy". Thesis adviser: Prof. Alex Pines
- National Tsinghua University, Taiwan; M.S. Physics, 1976
- National Taiwan University, Taiwan; B.S. Physics, 1974

Work experience

- Senior Scientist, Dept. Chemistry, Caltech (2014-present)
- Research Fellow (2007 -2014) Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan
- Associate Director (2007-2010), Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan
- Adjunct Professor, Institute of Photonics, National Chiao Tung University, Hsinchu, Taiwan (2007 -2014)
- Senior Scientist, California Institute of Technology, Pasadena, California (2003-2007)
- Senior Engineer, Opvista, California (2001-2002)
- Member of Technical Staff, Bell Laboratories, New Jersey (1998-2001)
- Physicist, Argonne National Laboratory, Illinois (1981-1998)

Awards & patent

2010 APS Fellow – American Physical Society, Citation: For his contributions in elucidating the structure and the radical-pair mechanism of photosynthetic systems, photoinduced charge transfer and blinking in single nanocrystals, as well as in developing multi-quantum

NMR and linear prediction filtering techniques, and for his work on nonblinking and less toxic nanostructures for biophotonics.

Distinguished Scholar – Foundation for the Advancement of Outstanding Scholarship Taiwan, 2007-2011.

R&D 100 Award – top 100 innovations in US, R&D Research and Development Magazine, September (1988) for the contributions on linear prediction method in magnetic resonance.

Argonne Director's Award – laboratory wide award by the Director of Argonne National Laboratory (1986) for my contribution to solving the x-ray structure of photosynthetic reaction center *Rhodopseudomonas sphaeroides*. This paper has received 500 Scientific citations till 2007

Two Argonne Pacesetter Awards - distinguished achievement award, 1986

U.S. Patent – Single-bunch synchrotron shutter, 1991

Service to science communities & editorship

Board Director of ANNA, Asian Nanoscience and Nanotechnology Association (2010 - 2012)

Chairman of ANNA-Taiwan Regional Executive Committee (2010-2012t)

Senior Editor, Nano Reviews (2009 – 2012)

Senior Editor, Nano Communications International (2012)

Editorial Board of ISRN Physical Chemistry (2011 - 2012)

Chairman, 2012 RCAS-ANNA Symposium on Recent Development in Nanomaterials: Structures, Dynamics and Applications, Oct. 4-5,, Taipei, Taiwan

Chairman, 2011 RCAS-ANNA Symposium on Studies of Nano and Bio-Materials using Laser, X-Ray and Single-Molecule Techniques, Nov. 17-18, Taipei, Taiwan

Organizing Committee – **AS-JIST Workshop on Innovative use of Light and Nano-bio Materials**, May 26-27, 2011, Taipei, Taiwan

Chairman, 2010 International Symposium on General Aspects of Graphene, Carbon Nanotube and Ultrafast Phenomena of Nanomaterials, Nov. 15-16, Taipei, Taiwan

Organizing Committee and Session Chair , ACUP 2010 (the 6th Asian Conference of Ultrafast Phenomena), Taipei, Taiwan

Organizing Committee – **6th Asian Countries Ultrafast Phenomena Conference** – Taipei, 2010

Chairman, RCAS-AIST Workshop on Single Molecule/Confocal Microscopy, RCAS, Academia Sinica, Oct. 15 (2009)

Reviewer for refereed journals - PNAS, JACS, ACS Nano, J. Phys. Chem., J. Chem. Phys., Phys. Rev., APL, Chem. Phys. Lett., Anal. Chem., Lightwave Syst., Nanoscale, etc.

H-index: 30, accumulated citations > 2400

High Impact Factor (IF > 7) Publications

(Science, Nature, Nature Comm., Nano Lett., ACS Nano, PNAS, PRL, JACS)

1) 4 Najafi, T. D. Scarborough, Jau Tang, A. H. Zewail , Science 347, 164 (2015), “4D imaging of carrier interface dynamics in p-n junctions.” (SCI IF = 34.66)
2) B-K Yoo, O. H. Kwon, H. Liu, Jau Tang, A. H. Zewail, Nature Communications 6, No. 8639 (2015), “Observing in space and time the ephemeral nucleation of liquid-to-crystal phase transitions” (SCI IF = 11.33)
3) H. Liu, O. H. Kwon, Jau Tang, A. H. Zewail. Nano Lett. 14, 946 (2014), ”4D Imaging and Diffraction Dynamics of Single-Particle Phase Transition in Heterogeneous Ensembles” (SCI IF = 13.78)
4) H. H. Liu, O. H. Kwon, J. Tang and A. H. Zewail, Nano Lett. 7, 2552 (2014),“4D Imaging and Diffraction Dynamics of Single-Particle Phase Transition in Heterogeneous Ensembles”. (SCI IF = 13.198)
5) P. Lee, W.-C. Li, B.-J. Chen, C.-W. Yang, C.C. Chang, I. Botiz, G. Reiter, T. L. Lin, J. Tang, A. C.M. Yang, ACS Nano 7, 6659 (2013), Massive Enhancement of Photoluminescence through Dewetting”. ". (SCI IF = 11.421)
6) C. T. Yuan, Y. G. Wang, K. Y. Huang, T. Y. Chen, P. Yu, J. Tang, A. Sitt, U. Banin, and O. Millo, ACS Nano 6, 176 (2012), "Single-Particle Studies of Band Alignment Effects on Electron Transfer Dynamics from Semiconductor Hetero-Nanostructures to Single-Walled Carbon Nanotubes". (SCI IF = 11.421)
7) J. Chen, W. K. Chen, J. Tang, P, M. Rentzepis, PNAS 108, no. 47, 18887 ((2011), "Time Resolved X-ray Diffraction Studies on Ultrafast Melting, contraction and Wave Propagation in Au(111) thin crystal film induced by fs laser pulses". (SCI IF = 9.771).
8) C. T. Yuan, P. Yu, H. C. Ko, J. Huang, and J. Tang, ACS Nano 3, 3051 (2009), "High Performance Nonblinking Single-Photon Sources". (SCI IF = 11.421)
9) J. Tang and R. A. Marcus, Phys. Rev. Lett. 95, 107401 (2005), “Diffusion-controlled Electron Transfer Processes and Power-law Statistics of Fluorescence Intermittency of Nanoparticles”. (SCI IF = 7.621)
10) V. A. Lobastov, J. Weissenrieder, J. Tang and A. H. Zewail, Nano Lett. 7, 2552 (2007), “Ultrafast Electron Microscopy of Nanostructured Materials: 4D Imaging and Diffraction during Phase Transitions.” (SCI IF = 13.198)
11) J. Tang and J. R. Norris, Nature 333, 216 (1988), "Padé Approximation and the Linear Prediction Method". (SCI IF = 36.101)
12) K. Hasharoni, H. Levanon, J. Tang, M. K. Bowman, J. R. Norris, D. Gust, T. A. Moore, and A. L. Moore, JCAS 112, 6477 (1990), "Singlet Photochemistry in Model Photosynthesis: Identification of Charge Separated Intermediates by Fourier Transform & CW EPR Spectroscopies". (SCI IF = 9.019)
13) J. R. Norris, M. K. Bowman, D. E. Budil, J. Tang, C. A. Wraight, and G. L. Closs, Proc. Natl. Acad. Sci. U.S.A. 79, 5532 (1982), "Magnetic Characterization of the Primary State of Bacterial Photosynthesis". (SCI IF = 9.771)

Publications on 4D electron microscopy

1) X. W. Fu, B. Chen, M. Th. Hassan, Jau Tang*, A. H. Zewail, Science (submitted) ,“Imaging anomalous rotational dynamics of a nanoparticle in liquid by 4D electron microscopy”,
2) J. Cho*, T. Y. Hwang, E. Najari, H. Li, J. S. Baskin, Jau Tang*, A. H. Zewail, Nature Phys. (submitted), “Observing dynamical crater-shaped charge distribution in monolayer graphene by 4D electron microscopy”,
3) B. Chen*, X.W. Fu, Jau Tang*, M. Lysevych, H. H. Tan, C. Jagadish, A. H. Zewail. , Nature Comm. (submitted), “Eutectic dynamics and control of gold-encapped gallium arsenide nanowires imaged by 4D electron microscopy”. “
4) X. W. Fu*, B. Chen, Jau Tang*, A. H. Zewail, Nature Phys. (in preparation),“Nanobubbe-driven superfast Brownian dynamics of photoexcited gold nanoparticles using 4D electron microscopy”.
5) M. Kaplan, B.K. Yoo, J. Tang*, D. Baltimore, G. J. Jensen*, A. H. Zewail, Science (in preparation), “Cellular PINEM imaging of ligand-induced receptor conformational changes by 4D electron microscopy”.”.
6) E. Najafi[1], T. D. Scarborough, Jau Tang, A. H. Zewail, Science 347, 164 (2015), ”4D imaging of carrier interface dynamics in p-n junctions”.
7) B-K Yoo, O. H. Kwon, H. Liu, Jau Tang, A. H. Zewail, Nature Communications 6, No. 8639 (2015), “Observing in space and time the ephemeral nucleation of liquid-to-crystal phase transitions,
8) H. Liu, O. H. Kwon, Jau Tang, A. H. Zewail , Nano Lett. 14, 946 (2014),“4D Imaging and Diffraction Dynamics of Single-Particle Phase Transition in Heterogeneous Ensembles”,.
9) J. Tang, J. Chem. Phys. **128**, 164702 (2008), “Coherent Phonon Excitation and Linear Thermal Expansion in Structural Dynamics and Ultrafast Electron Diffraction of Laser-Heated Metals”.
10) V. A. Lobastov, J. Weissenrieder, J. Tang and A. H. Zewail, Nano Lett. **7**, 2552 (2007), “Ultrafast Electron Microscopy of Nanostructured Materials: 4D Imaging and Diffraction during Phase Transitions.“
11) J. Tang, D. S. Yang and A. H. Zewail, J. Phys. Chem. C **111**, 8957 (2007). “Time-resolved Ultrafast Electron Crystallography. III Theoretical Modeling of Structural Dynamics”.

Scientific community service

Other than performing academic research in several interdisciplinary branches in chemistry, physics, biological sciences and engineering, I have served in many scientific communities and have organized several symposiums.

1) senior board director of Asian Nanoscience and Nanotechnology Association (ANNA) with its headquarter in Japan with Prof. Ahmed H. Zewail as its Honorary President;

2) chairman of the ANNA-Taiwan, the local chapter of ANNA in Taiwan;

3) senior editor of Nano Reviews & senior editor, Nano Communication International.

4) senior editor, Nano Communications International

5) editor of ISRN Physical Chemistry; the chair of 2011 RCAS-ANNA Symposium

6) chair, 2012 Symposium on Recent Development in Nanomaterials: Structures, Dynamics and Applications, Oct. 4-5, Taipei, Taiwan

7) chair, 2011 Symposium on “Studies of Nano and Bio-Materials using Laser, X-Ray and Single-Molecule Techniques”, Nov. 17-18, Taipei, Taiwan Studies of Nano and Bio-Materials using Laser, X-Ray and Single-Molecule Techniques, Nov. 17-18, Taipei, Taiwan, with over 250 participants;

8) chair, 2010 International Symposium on “General Aspects of Graphene, CNT and Ultrafast Phenomena of Nanomaterials”, Nov. 14-16, Taipei, Taiwan, with over 300 participants;

9) chair, 2009 RCAS-AIST Workshop on “Single-Molecule and Confocal Microscopy”, Oct. 15, 2009, Taipei, Taiwan.

10) referee for many journals, including PNAS, JACS, ACS Nano, J. Phys. Chem., J. Chem. Phys., Chem. Phys. Lett., Phys. Rev., Chem. Phys., Applied Physics Letters, Anal. Chem., J. Lightwave Systems, Nanoscale, Nano Reviews, J. Chinese Chem. Soc., etc.

11) co-organized several other conferences and workshops on various subjects related to nanosciences.

Major contributions:

1. **Award winning work on the x-ray structural determination of photosynthetic reaction center.** Working with the team members at Argonne National Laboratory, we determined in late 1985 the x-ray protein structure of *Rhodopseudomonas sphaeroides* R-26 reaction center. This work was parallel to the other work by German scientists Deisenhofer, Huber and Michel who were awarded a 1988 Nobel Prize in Chemistry for their x-ray structural determination work on a different species *viridis* . My major contribution in this team work is to develop efficient method to solve the x-ray phase problem. Because of my being able to solve it to allow full crystal structure determination promptly, the Argonne team won the the very competitive race with other group lead by G. Feher at UC San Diego who was also working on the same species as ours. Our work was awarded in 1986 an Argonne National Laboratory Director Award, the highest achievement award in Argonne. Due to its scientific importance, this paper (ref. 23) has been cited more than 500 times.

2. **R&D 100 Award winning development of the linear prediction (LP) method**. This method could be applied to any FFT-based spectroscopy, such as NMR, FTIR, EXFAS, image processing, etc. It avoids signal truncation artifacts encountered by FFT to provide improved spectral resolution and noise filtering. Taking NMR FID signals as an example, signal truncation often leads to degradation in spectral resolution and sinc wiggling artifacts in FFT spectroscopy. These problem can be avoided with linear prediction analysis of the given truncated data record to "predict" forward or backward in time, or recover unrecorded data. In addition, the LP method provides filtering capability to reject noise with no correlation in time and to retain the coherent signals which have long correlation time constants. My work on 1-D and 2-D LP signal processing (refs. 15, 20, 21, 35) was selected as one of the top 100 innovations in US, and was recognized widely by receiving an R&D 100 Award from the R&D Research and Development Magazine, September in 1988. My LP work was presented an Argonne Pace Award from the ANL director in 1986.

3. **Elucidation of the mechanism for the inverse power law blinking statistics of single quantum dots (QDs).** By extending the electron transfer theory for an ensemble system with indistinguishable particles to a single and distinguishable nanoparticles system such as a quantum dot or a nanorod, we (with Nobel Laureate R. Marcus from Cal Tech) provide a model based on diffusion-controlled electron transfer reactions to explain how the spectral diffusion due to energy fluctuations for the light and dark states affects the electron transfer between there two states to cause the inverse power-law behavior for the waiting time distribution for both the light and the dark events. With our model, we can explain naturally the causes for the inverse power-law blinking, the exponent of the power law and the long-time exponential tail. Our model has been able to explain successfully many experimental measurements. Two of pioneering publications (refs. 83-84) on this subject since 2005 have received high citations with total no. of citation ~ 300 times.

4. **4D electron microscopy of photoinduced carrier dynamics, structural dynamics and Brownian dynamics of nanomaterials.** I established pin in our 2015 Science paper hotoinduced ballistic charge carrier dynamics across p-n junction p-n junction. Unlike carrier diffusive processes in bulk semiconductors, we have found that these hot electrons and holes move as ballistic objects as a result of weak electron-phonon interactions on the surface, In another work (Nature Comm.) we demonstrated two-stage nanocrystal growth involving intermediate nucleation state which involves isothermal process at the phase transition

temperature. In another work, we discover unusual ultrafast carrier dynamics in graphene involving Auger-assisted relaxation with optical phonons and surface plasmons to cause fast exciton annihilation and to result in crater-shaped spatial charge distribution in USEM images. In several other work using 4D electron microscopy, submitted to Science, Nature Phys., and Nature Comm, we have investigated fast rotational and translational dynamics of fs laser-heated gold nanodimers and spherical nanoparticles in liquid cells, discovering a wide range of ballistic, superdiffusion and normal Brownian diffusion regimes and elucidating steam nano bubbles as driving forces. We have also in another work demonstrated the utilize electron-surface plasmonic wave interactions to improvecellular imaging of receptor-ligand interactions and conformational changes in biological systems.

5. **Control of fluorescence blinking and blinking suppression.** Although fluorescence blinking is a very interesting physical phenomenon, it is an undesirable feature in many applications for the QD as a light source in optoelectronics applications or fluorescence label in bioimaging applications. .Therefore, control of blinking and its suppression are important issues. We demonstrated (ref. 106) blinking can be fully suppressed via plasmonic effect when QDs were coupled to silver nanoprisms at a proper distance. We have also demonstrated that by changing the electrostatic environment of QDs, the photoluminescence properties of QDs such as fluorescence lifetime and blinking behavior could be influenced. We have shown by confined the QDs in agarose gel with negatively charged fiber molecules and no-sized pores (ref. 113, 126), or with a change of the pH value of the surrounding environment of QDs (135), we could partially or even completely suppress the blinking behavior. Moreover, we have demonstrated for the first time that the reorganization energy for the electron transfer is relatively small and we have observed the interesting Marcus inverted regime for the electron transfer for QDs in gel with a low pH.

6. **Development of high performance single photon sources and nano-sized lasers.** Single photon source at room temperature is desirable for quantum information technology. Recently, we demonstrated a high performance nonblinking single photon source (ref. 110). In a such a prototype device, we showed that by properly coupling to silver nanoprisms single CdSe/ZnS semiconductor quantum dots (QDs) exhibit suppressed blinking behavior, an enhanced fluorescence intensity (~2.5 fold), increased radiative decay rates (~12.5 fold). Our observation of anti-bunching single-photon emission clearly indicated that each QD is a single-photon emitter. We have also used another approach to fabricate a single-photon emitter by placing a single QD on a nanodisk. We have observed single photo emission from such a coupled QD parallel to the plane of the nanodisk (ref. 134). Recently, also demonstrated better control of the light emission from such a single-photon source by coupling it to a nano-antenna based on plasmonic effects. In addition, we have used the nanodisk as a resonant cavity to support the whispering galley modes of QDs which behave as a gain medium. With a device, we demonstrated a prototype nanolaser with a very low threshold operation power at only about 1 μW.

7. **Laser heating and ultrafast structural dynamics of nanomaterials.** We developed theoretical modeling to analyze time-resolved electron (with Nobel Laureate A. H. Zewail from Cal Tech) or x-ray diffraction (with P. M. Rentzepis from UC Irvine) measurements of nanomaterials heated by a femtosecond laser. By combing the Fermi-Pasta-Ulam (FPU) anharmonic chain model with the two-temperature model (refs. 92, 97) , we were able to provide quantitative account for the photoinduced coherent acoustic phonon excitation of metallic nano-structured materials. More recently, this1-D model was generalized to multi-

dimension to explain planar phonon mode excitations of silver nanoprisms and other multi-mode excitation of nanoparticles of different shapes such as nanocubs, nanorods, etc. In another experimental work we were able to determine at room temperature the electronic Grüneisen parameter from the photo-excited coherent acoustic vibrational phonon modes and their laser fluence dependence. Unlike our room temperature measurement approach using the pump-probe techniques, the determination of such a parameter usually was done at the cryogenic temperature using a different method called dilatometerry. We have also obtained excellent agreement between theoretical modeling and the experimental data of laser induced melting of gold single crystals from time-resolved x-ray diffraction (ref. 136). We have observed large deviations from predicted linear temperature dependence by the Drude model for the electron thermal conductivity and specific heat. More recently, we have investigated experimentally nonlinear optical absorption of carbon-based nanomaterials such as carbon nanotubes and grapheme and their derivatives to develop cost-effective saturable absorbers for high power passive mode locking in picosecond to femtosecond laser pulse generation to replace the conventional expensive semiconductor saturable absorber mirrors (SESAM) (ref. 126).

8. **Elucidation of the carrier dynamics and the fluorescence mechanisms for gold nanoclusters and carbon nanodots.** We have used fs laser techniques and confocal microscopy with time-correlated single-photon counting techniques to investigate the carrier dynamics and the mechanisms for the fluorescent gold nanoclusters and carbon nanodots (ref. 165-168). We elucidated the delayed fluorescence mechanism due to the singlet-triplet crossing mechanisms and we determined the energetics for the involved electronic states. These novel nanomaterials can have great potential applications for optoelectronics as LEDs and quantum light sources as well as in biosensing and fluorescence markers.

9. **Exploring the radical-pair mechanism of photoinduced electron transfer processes using electron spin resonance.** We (with J. R. Norris at U. of Chicago) demonstrated (ref. 53) how to measure the exchange and electron-electron dipolar interactions from electron spin echo envelope modulation and free induction decay in a photo-induced spin-correlated radical pair. The modulation frequencies provide useful information for systems with small exchange and dipolar interactions even if the hyperfine inhomogeneity often produces unresolved spectra in cw EPR. In addition, we have also demonstrated experimentally and theoretically the use of EPR at X-band as well as at K- and W-band (refs. 6, 38, 74-76) based on the radical pair mechanism to characterize the charge transfer processes and the structures in natural and artificial photosynthetic systems. We have also demonstrated (refs. 10, 63) the use of EPR line shape analysis to determine fast spin migration dynamics in a linear chain or loop, such as mobile soliton in polyacetylene and electron hopping in a photosynthetic light harvesting antenna, etc.

Complete Publication List

H Index = 30

Accumulated citations > 2400

196) X. W. Fu, B. Chen, M. Th. Hassan, Jau Tang*, A. H. Zewail, Science (submitted),

“Imaging anomalous rotational dynamics of a nanoparticle in liquid by 4D electron microscopy”,

195) J. Cho*, T. Y. Hwang, E. Najari, H. Li, J. S. Baskin, Jau Tang*, A. H. Zewail, Nature Phys. (submitted),

“Observing dynamical crater-shaped charge distribution in monolayer graphene by 4D electron microscopy”,

194) B. Chen*, X.W. Fu, Jau Tang*, M. Lysevych, H. H. Tan, C. Jagadish, A. H. Zewail. , Nature Comm. (submitted),

“Eutectic dynamics and control of gold-encapped gallium arsenide nanowires imaged by 4D electron microscopy”. “

193) X. W. Fu*, B. Chen, Jau Tang*, A. H. Zewail, Nature Phys. (in preparation),

“Nanobubbe-driven superfast Brownian dynamics of photoexcited gold nanoparticles using 4D electron microscopy”.

192) M. Kaplan, B.K. Yoo, J. Tang*, D. Baltimore, G. J. Jensen*, A. H. Zewail, Science (in preparation),

“Cellular PINEM imaging of ligand-induced receptor conformational changes by 4D electron microscopy”.”.

191) E. Najafi[1], T. D. Scarborough, Jau Tang, A. H. Zewail, Science 347, 164 (2015),

,”4D imaging of carrier interface dynamics in p-n junctions”.

190) B-K Yoo, O. H. Kwon, H. Liu, Jau Tang, A. H. Zewail, Nature Communications 6, No. 8639 (2015),

“Observing in space and time the ephemeral nucleation of liquid-to-crystal phase transitions,

189)H. Liu, O. H. Kwon, Jau Tang, A. H. Zewail , Nano Lett. **14**, 946 (2014),

“4D Imaging and Diffraction Dynamics of Single-Particle Phase Transition in Heterogeneous Ensembles”,.

188) X. M. Wen, P. Yu, X. Ma, Y.-R. Toh and J. Tang, Chem. Comm. (in press, 2014),

“On the Upconversion Fluorescence in Carbon Nanodots and Graphene Quantum Dots".

187) H. H. Liu, O. H. Kwon, J. Tang and A. H. Zewail, Nano Lett. **7**, 2552 (2014),

“4D Imaging and Diffraction Dynamics of Single-Particle Phase Transition in Heterogeneous Ensembles”.

186) X. Ma, X. M. Wen*, Y.-R. Toh, K.-Y. Huang, J. Tang and P. Yu*, Nanotechnology 25, 445 (2014),

"Dynamic study on the atomically precise size transformation process of gold nanoclusters" ..

185) X. M. Wen*, P. Yu*, Y.-R. Toh, Y.-C. Lee, K. Y. Huang, S. Huang, S. Shrestha, G. Conibeer and J. Tang*, J. Mater. Chem. C2, 3826 (2014),

"Ultrafast Directional Electron Transfer in Nanocomposite of Graphene Oxide/Au Nanocluster with Graphene Oxide As a Donor"

184) X. M. Wen*, P. Zhang, T. Smith, R. J. Anthony, U. R. Kortshagen, P. Yu, Y.-R. Toh, J. Tang, Y. Feng, S. Shrestha, G. Conibeer, M. Green and S. Huang*, Phys. Rev. Lett.,

"The Origin of Photoluminescence and Correlation with Surface State in Colloidal Silicon Nanocrystals" (submitted).

183) P. Yu*, X. M. Wen*, Y.-R. Toh, X. Q. Ma, and J. Tang*, Nano Comm. Int., "Dynamics, Structures and Applications of Metallic Nanoclusters" (invited review article).

182) P. Yu*, X. M. Wen, Y.-R. Toh, Y.-C. Lee, K.-Y. Huang, S. Huang, S. Shrestha, G. Conibeer and J. Tang*, J. Mater. Chem. C2 2894 (2014).

"Efficient Electron Transfer in Carbon Nanodot-Graphene Oxide,

181) P. Yu, X. M. Wen, Y.-C. Lee, W.-C. Lee, C.-C. Kang* and J. Tang*, J. Phys. Chem. Lett. 4, 3596−3601 (2013),

"Photoinduced Ultrafast Charge Separation in Plexcitonic CdSe/Au and CdSe/Pt Nanorods".

180) C. T. Yuan, Y. C. Wang, H. W. Cheng, H. S. Wang, M. Y. Kuo, M. H. Shih, J. Tang*, J. Phys. Chem. C 117, 12762 (2013),

"Modification of Fluorescence Properties in Single Colloidal Quantum Dots by Coupling to Plasmonic Gap Modes".

179) H. W. Cheng, Y. C. Chang, C. T. Yuan, S. N. Tang, C. S. Chang, J. Tang, F. R. Chen, R. L. Pan, F. G. Tseng*, J. Phys. Chem. C 117, 13239 (2013),

"Simple and Fast Method To Fabricate Single-Nanoparticle-Terminated Atomic Force Microscope Tips".

178) H. W. Cheng, Y. C. Chang, S. N. Tang, C. T. Yuan, J. Tang, F. G. Tseng, Nanoscale Res. Lett. 8, 482 (2013),

"Characterization of single 1.8-nm Au nanoparticle attachments on AFM tips for single sub-4-nm object pickup".

177) C. T. Yuan, C. A. Lin, T. N. Lin, W. H. Chang, J. L. Shen, H. W. Cheng, and J. Tang*, J. Chem. Phys. (in press, 2013,

"Probing Electronic Triplet States of Fluorescent Gold Nanoclusters at the Single-Molecule Levels".

176) X. M. Wen, P. Yu, , J. Tang* and V. Podzorov, J. Phys. Chem. C 117, 17741–17747 (2013), "Singlet and Triplet Carrier Dynamics in Rubrene Single crystal".

175) X. M. Wen*, P. Yu, Y.-R. Toh, X. Q. Ma, S. J. Huang and J. Tang*, Nanoscale 5, 10251-10257 (2013), "Fluorescence Origin and Spectral Broadening Mechanism in Atomically Precise Au8 Nanoclusters".

174) P. Yu*, X. M. Wen, Y.-R. Toh, Y.-C. Lee and J. Tang*, RSC Adv. 3, 19609-19616 (2013),"Optical Properties of Gold Particle-Cluster Core-Satellite Nanoassemblies".

173) M. Y. Ng, P. Yu, J. Tang*, Y. C. Chang*, J. Phys. Chem. C 117, 13697–13707 (2013), "Sound Wave Propagation Anisotropy in Silver Nanoprisms: Characterization of Photoinduced Multiple Modes Using the Symmetric Molecular Dynamics Method".

172) J. Tang, A. Oguz-Er, J. Chen and P. M. Rentzepis, J. App. Phys. (submitted),
"Acoustic blast waves in a bilayer metallic film induced by femtosecond pulsed laser: A time-resolved X-ray diffraction study".

171) H. W. Cheng, C. T. Yuan, J. S. Wang,T. N. Lin, J. L. Shen,Y. J. Hung,F. G. Tseng, and J. Tang, JPC C (in press),
"A Trade-off between Pure Single-Photon Emission and Blinking Suppression in Single Colloidal Quantum Dots".

170) P. Yu, X.M. Wen, Y.R. Toh, Y.C. Lee, X.Q. Ma and.J. Tang, Nanoscale (in press, 2013),
"Optical Properties of Gold Particle-Cluster Core-Satellite Nanoassemblies".

169) P. Lee, W.-C. Li, B.-J. Chen, C.-W. Yang, C.C. Chang, I. Botiz, G. Reiter, T. L. Lin, J. Tang, A. C.M. Yang, ACS Nano (in press, 2013),
Massive Enhancement of Photoluminescence through Dewetting".

168) C. T. Yuan, Y. C. Wang, H. W. Cheng, H. S. Wang, M. Y. Kuo, M. H. Shih, and J. Tang, JPC C 117 (24) 12762 (2013),

"Concurrent Enhancement of Exciton and Bi-exciton Quantum Yields of Single Colloidal Quantum Dots by Coupling to Plasmonic Gap Modes".)

167) M. Y. Ng, P. Yu, J. Tang*, Y. C. Chang*, J. Phys. Chem. C 117, 13697–13707 (2013), "Sound Wave Propagation Anisotropy in Silver Nanoprisms: Characterization of Photoinduced Multiple Modes Using the Symmetric Molecular Dynamics Method".

166) X.M. Wen, P. Yu, Y.R. Toh, X.T. Hao, and Jau Tang, Adv. Opt. Materials **1** 173 (2013),
"Intrinsic and Extrinsic Fluorescence in Carbon Nanodots: Ultrafast Time-Resolved Fluorescence and Carrier Dynamics".

165) P. Yu, X. M. Wen, Y. C. Lee, W. Y. Hsu, C. C. Kang, and J. Tang Chem. Phys. Chem. (submitted),
"Ultrafast Carrier Dynamics in Plexcitonic CdSe/Au and CdSe/Pt Nanorodss".

164) H. W. Cheng, Y. C. Chang, C. T. Yuan, S. N. Tang, C. S. Chang, J. Tang, F. R. Chen, R. L. Pan, F. G. Tseng, JPC C (2013),
"Simple and Fast Method to Fabricate Single-Nanoparticle-Terminated AFM Tips/

163) A. Oguz Er, J. Chen, J. Tang, and P. M. Rentzepis, APL **102**. 051915 (2013),
"Laser Induced Acoustic Phonon Propagation in Cu/Ag(111) by Time-resolved X-ray Diffraction".

162) Y. R. Toh, P. Yu, X. M. Wen and J. Tang, Journal of Colloid and Interface Science **402**, 86(2013),
"The Enhancement of Electron-Phonon Coupling in Glutathione-protected Au25 Clusters".

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