

# PIPT9 Detailed Program

## Day 1 — Monday, October 26

8:00–8:50 Registration

8:50–9:00 Opening remarks

### Superconductors and correlated materials

9:00–9:25 **Andrea Cavalleri** — *New physics in driven quantum materials*

9:25–9:50 **Eugene Demler** — *Illuminating insights into high  $T_c$  cuprates: nonlinear terahertz spectroscopy and light enhanced coherence*

9:50–10:05 **Kaj Kelson** — *Probing renormalisation of driven  $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$  phonons by phase sensitive mid-infrared spectroscopy*

10:05–10:20 **Taisei Tomiyasu** — *Two-dimensional terahertz spectroscopy of c-axis superconducting coherence in the stripe phase of La-based cuprate superconductors*

10:20–10:50 Coffee break

### Superconductors and density wave systems

10:50–11:15 **Dragan Mihailović** — *Light-induced programmable superconductivity (LiPS) created at an Al-Si heterojunction*

11:15–11:40 **Yao Wang** — *Stabilization and light control of triplet pairing in strongly correlated materials*

11:40–11:55 **Morihiko Nishida** — *THz third-harmonic generation from driven superconductors*

11:55–12:10 **Takeshi Suzuki** — *Photo-induced structural phase transition in  $4\text{Hb-TaS}_2$  investigated by time-resolved X-ray diffraction measurements*

12:10–13:30 Lunch

### Density wave systems

13:30–13:55 **Kozo Okazaki** — *Ultrafast Van Hove singularity modulation and charge-order fluctuations in Kagome superconductor  $\text{CsV}_3\text{Sb}_5$  revealed by time-resolved ARPES*

13:55–14:20 **Chao Lian** — *Real-time TDDFT unveils correlated electron–phonon–spin dynamics in photoinduced phase transitions*

14:20–14:45 **Kota Katsumi** — *Terahertz-driven amplitude mode in the chiral charge-density-wave candidate  $1\text{T-TiSe}_2$*

14:45–15:00 Short break

## Organic conductors and metal-organic frameworks

15:00–15:15 **Keiki Fukumoto** — *Imaging thermally and photo induced phase transition using femtosecond photoelectron emission microscopy*

15:15–15:30 **Roman Bertoni** — *Ultrafast spectroscopy of coherent phonons during pressure-driven phase transitions*

15:30–15:45 **Tadahiko Ishikawa** — *Ultrafast selection of a photoinduced hidden state through bond-order-wave lattice relaxation in a donor–acceptor metal–organic framework*

15:45–15:50 Coffee break

15:50–17:50 **Poster session 1**

18:00–20:00 **Welcome dinner**

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## Day 2 — Tuesday, October 27

### Ultrafast charge and lattice dynamics in functional materials

9:00–9:25 **Hiroshi Okamoto** — *From giant optical nonlinearity to Floquet excitons and high-harmonic generation in Mott insulators*

9:25–9:50 **Eric Collet** — *When ultrafast photoinduced charge-transfer polarons cooperatively drive a macroscopic nucleation towards a persistent phase*

9:50–10:05 **Yoichi Okimoto** — *Polarization structure and photoexcited dynamics in  $R\text{Fe}_2\text{O}_4$*

10:05–10:20 **Hirotake Ito** — *Sub-picosecond cooperative enhancement of electronic-ferroelectric polarization in  $\text{LuFe}_2\text{O}_4$  triggered by a terahertz field*

10:20–10:50 Coffee break

### Ultrafast dynamics of quasiparticles and spins in superconductors

10:50–11:15 **Shinichiro Iwai** — *Ultrafast decoupling of quasiparticles and spin fluctuations in superconducting cuprates*

11:15–11:40 **Eryin Wang** — *The picosecond depairing currents and diode effect in type-II superconductors*

11:40–11:55 **Takami Tohyama** — *Nonequilibrium charge dynamics in Hubbard models*

*explored via time-dependent DMRG*

11:55–12:10 **Xiaoyue Zhou** — *Exciton interlayer tunneling transport driven by strong multi-THz field in a TMD heterostructure*

12:10–13:30 Lunch

## **Vacuum field-induced phenomena in cavities**

13:30–13:55 **Daniele Fausti** — *Cavity control of quantum materials*

13:55–14:20 **Jun Kono** — *Cavity-coupled quantum materials*

14:20–14:45 **Martin Claassen** — *Floquet and cavity engineering of topological quantum materials and their quantum-optical signatures*

14:45–15:00 Short break

## **Insulator-to-metal transitions**

15:00–15:15 **Alexander Boris** — *Nonequilibrium metallic phase under continuous optical drive in the antiferromagnetic Mott insulator  $\text{Ca}_3(\text{Ru}_{0.99}\text{Ti}_{0.01})_2\text{O}_7$*

15:15–15:30 **Ernest Pastor** — *The role of polarons in driving and controlling functionality in photocatalytic and phase-change materials*

15:30–15:45 **Tatsuya Amano** — *Ultrafast precursor dynamics of photoinduced insulator-metal transition in  $\text{V}_2\text{O}_3$*

15:45–15:50 Coffee break

15:50–17:50 **Poster session 2**

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## **Day 3 — Wednesday, October 28**

### **Correlated materials and density waves**

9:00–9:25 **Simon E. Wall** — *Probing light induced phases on the nanoscale from femtoseconds to seconds*

9:25–9:50 **Chong-Yu Ruan** — *Phononic control of ultrafast metal–insulator switching revealed by physics-informed deep learning and multimodal measurements*

9:50–10:05 **Jure Demsar** — *Dynamics of light-driven ferromagnetic to charge density waves phase transition in  $\text{SmNiC}_2$*

10:05–10:20 **Celine Mariette** — *Recent advances in controlling ultrafast photoinduced transitions via strain waves in quantum materials*

10:20–10:50 Coffee break

## **Novel optical detection of spins, magnetic flux, and Berry-phase-related phenomena**

10:50–11:15 **Gregor Jotzu** — *Probing the THz magneto-dynamics of coherently driven spins and superconducting flux trapping*

11:15–11:40 **Ryusuke Matsunaga** — *All-optical terahertz probing of spin, orbital, and valley transport dynamics in semiconductors*

11:40–11:55 **Fernando Peñaranda** — *Photogalvanic effects as symmetry breaking indicators in twisted Bilayer Graphene*

11:55–12:10 **Yuta Murotani** — *Role of Berry curvature engineering by electric field in light-induced anomalous Hall effect*

12:10–13:30 Lunch

## **Magnetism 1**

13:30–13:55 **Nuh Gedik** — *Coherent terahertz control of metastable magnetization in a Van der Waals antiferromagnet*

13:55–14:20 **Hideki Hirori** — *Terahertz light-field engineering for nonlinear control of antiferromagnetic spins*

14:20–14:45 **Liang Wu** — *Energy-efficient light control of a hidden stable phase in a strongly correlated magnetic metal*

14:45–15:00 Short break

15:00–15:15 **Naotaka Yoshikawa** — *Optically reconfigurable terahertz metasurface enabled by all-optical magnetization switching in the ferromagnetic Weyl semimetal  $\text{Co}_3\text{Sn}_2\text{S}_2$*

15:15–15:30 **Inhyeok Choi** — *THz-driven ionic magnetism in a quantum paraelectric  $\text{SrTiO}_3$*

15:30–15:45 **Masahiro Sato** — *Theory for THz-laser driven harmonic generation in ordered and quantum magnets*

15:45–16:00 Coffee break

## Chiral phonons

16:00–16:25 **Urs Staub** — *Chiral/axial phonons and their angular momentum*

16:25–16:50 **Sebastian Maehrlein** — *Transfer and conservation of angular momentum among crystal lattice modes*

16:50–17:05 **Changjae Roh** — *Light-driven orbital-selective polarization control in metal*

17:05–17:20 **Sota Kitamura** — *Quantum-geometric effects in nonlinear phononics*

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## Day 4 — Thursday, October 29

### Floquet engineering and strong-field effects

9:00–9:25 **Ulrich Höfer** — *Subcycle momentum microscopy of Landau-Zener-Majorana transitions*

9:25–9:50 **Takashi Oka** — *Nonperturbative optics in quantum materials: Floquet engineering and wave-driven nonequilibrium states*

9:50–10:05 **Weizhe Li** — *Sub-cycle photocurrent generation in a Floquet topological insulator*

10:05–10:20 **Kento Uchida** — *Dimensionality effects on high-harmonic generation in cuprates*

10:20–10:50 Coffee break

### Structural dynamics probed by UTEM and UED

10:50–11:15 **Kyoko Ishizaka** — *Nanoscale structural dynamics of photoexcited quantum materials revealed by ultrafast electron microscopy*

11:15–11:40 **Masaki Hada** — *Direct visualization of structural dynamics during terahertz field excitation by ultrafast electron diffraction*

11:40–12:20 Lunch

12:20– Excursion

18:00–20:00 Banquet

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## Day 5 — Friday, October 30

### Magnetism 2

9:00–9:25 **Tomasz Zalewski** — *Crystal-field excitations as a pathway for light-induced magnetization*

9:25–9:50 **Dinar Khusyainov** — *Texture-dependent control over photo-induced stochastic nucleation of nanoscale magnetic domains*

9:50–10:05 **Hiroki Wadati** — *Type-II-like ultrafast demagnetization in  $\text{NiCo}_2\text{O}_4$  thin films*

10:05–10:20 **Shingo Toyoda** — *Photoinduced antiferromagnetic domain switching in ferrotoroidic  $\text{LiNiPO}_4$*

10:20–10:50 Coffee break

### Structural dynamics, ferroelectrics, and strong-field effects

10:50–11:15 **Keith Nelson** — *THz-driven structural, magnetic, and textured ferroelectric responses*

11:15–11:40 **Yuta Murakami** — *Strongly correlated systems meet attosecond science: toward high-harmonic spectroscopy of correlated materials*

11:40–11:55 **Tatsuya Miyamoto** — *Control of nonreciprocal directional dichroism in  $\text{Bi}_2\text{CuO}_4$  using electric and magnetic fields of an intense terahertz pulse*

11:55–12:10 Closing remarks

# Poster presentations

## Poster session 1 — Monday, October 26, 15:50–17:50

P-01 **Kohei Hattori** — *Dirac charge in antiferromagnetic topological semimetals*

P-03 **Kotaro Tanaka** — *Transfer of orbital angular momentum of a terahertz vortex beam to a superconductor via Higgs mode excitation*

P-05 **Chihiro Mamiya** — *Linear Higgs optical response in time-reversal symmetry broken superconductors: symmetry classification*

P-07 **Ryusei Kataoka** — *c-axis terahertz nonlinear optical response in the superconducting state of  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$  studied by 2D-THz spectroscopy*

P-09 **Kohsuke Ataka** — *Development of asynchronous-sampling ultrafast spin noise spectroscopy for probing nanosecond magnetization fluctuations*

P-11 **Chih-Chieh Wu** — *Measuring dipolar magnetic field generated by circular phonons*

P-13 **Kota Aikyo** — *All-optical time-resolved observation of inverse orbital Hall effect in a single bulk semiconductor using terahertz polarimetry*

P-15 **Aline Vanderhaegen** — *Probing parametric phase mode amplification in  $\text{K}_{0.3}\text{MoO}_3$  using time-resolved terahertz spectroscopy*

P-17 **Jim Groefsema** — *Ultrashort coherent spin wave pulses in antiferromagnets*

P-19 **Masaki Yamamoto** — *Tuning the nonlinear dynamics of Raman-active phonons excited by strong THz pulses in a ferroaxial material  $\text{PbWO}_4$*

P-21 **Itsuki Nakamura** — *Numerical analysis of magnetic skyrmion generation via synergistic effect of laser heating and inverse Faraday effect*

P-23 **Keiya Uehara** — *One-photon resonance Floquet-Weyl states in topological insulators*

P-25 **Takeshi Hasebe** — *Ultrafast control of quantum states with wave-shape manipulation of chirped laser pulse*

- P-27 **Toshiya Shiratori** — *Spatiotemporal imaging of photoinduced phase transition in VO<sub>2</sub> by ultrafast transmission electron microscope*
- P-29 **Haruki Taira** — *THz-driven structural dynamics in 2H-MoTe<sub>2</sub> revealed by ultrafast electron diffraction*
- P-31 **Fumiya Sekiguchi** — *On-chip THz pump-probe spectroscopy of superconducting Nb microstrip*
- P-33 **Ken Inayoshi** — *Generalized Keldysh formalism for nonequilibrium correlation functions and its application to fluctuation dynamics of ordered states*
- P-35 **Hyo Seok Kim** — *Ultrafast optical anisotropy in strain-controlled (100) RuO<sub>2</sub> thin films*
- P-37 **Ryo Fukaya** — *Hierarchical photoinduced nonequilibrium dynamics of charge order and lattice displacements in an electronic ferroelectric material*
- P-39 **Yuya Ominato** — *Circular dichroism in second- and third-harmonic generation in chiral topological semimetal CoSi*
- P-41 **Ryohei Ikeda** — *Cycle by cycle electronic reconstruction imprinted on high harmonic generation in a cuprate Mott insulator*
- P-43 **Ryo Okugawa** — *Chern insulating phases and topological flat bands in cavity-embedded kagome systems*
- P-45 **Youngchan Choi** — *Even-order harmonics of Floquet-massive graphene in time-resolved high-harmonic generation*
- P-47 **Hyosub Park** — *Novel topological route beyond Floquet–Volkov paths*
- P-49 **Atsushi Ono** — *Real-time framework for extracting nonlinear response functions: Formulation and applications*

## Poster session 2 — Tuesday, October 27, 15:50–17:50

P-02 **Taiga Nakamoto** — *Momentum-resolved photoemission spectra of excitons in one-dimensional Mott insulators*

P-04 **Akihiro Sugisawa** — *Observation of the bulk photovoltaic effect in electronic ferroelectric  $\text{LuFe}_2\text{O}_4$*

P-06 **Eliez Ayad-Thomas** — *THz induced ultrafast spin dynamics in canted antiferromagnet  $\text{YFeO}_3$  measured by NIR probe birefringence and THz time domain spectroscopy*

P-08 **Toshiaki Kasashima** — *Cavity-induced modulation of high-harmonic generation in few-layer  $\text{WSe}_2$*

P-10 **Ryo Hamano** — *Photoinduced magnetic instabilities in the triangular-lattice double-exchange model: A correlation-function approach to dissipative Floquet electron systems*

P-12 **Ami Shirai** — *Arbitrary control of valley-dependent large anisotropic conductivity in germanium at room-temperature*

P-14 **Mizuki Akei** — *Temperature dependence of photoinduced coherent phonons and scattering mechanisms in transition-metal dichalcogenides*

P-16 **Cristhian Humberto Sumba Lusero** — *Ultrafast response of the charge density wave on  $\text{EuAl}_4$*

P-18 **Dorian Lagreve** — *Ultrafast dynamics in the Jahn–Teller-active Mott insulator  $\text{GaV}_4\text{S}_8$*

P-20 **Takahisa Kato** — *Photoinduced transition between low-temperature and high-temperature phases in a metal-organic framework*

P-22 **Hogara Watanabe** — *Theory of THz-laser driven spin pumping in antiferromagnets*

P-24 **Koki Kuroda** — *Mid-infrared light-induced anomalous Hall response in a high- $T_c$  cuprate superconductor  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$*

P-26 **Dongxue Han** — *Photothermal dynamics around a magnetic edge dislocation visualized by pump-probe Lorentz TEM*

P-28 **Yukina Mori** — *Observation of structural dynamics in organic light-emitting materials driven by terahertz waves*

P-30 **Kentaro Yamauchi** — *Polarization dependence of charge-density-wave-coupled phonons in photoexcited CeTe<sub>3</sub>*

P-32 **Lan Bo** — *Magnetic skyrmion interacting with optical skyrmion*

P-34 **Daigo Oue** — *Macroscopic quantum electrodynamics with gain: modified electromagnetic fluctuations and their consequences*

P-38 **Akira Takahashi** — *Photoinduced electronic ferroelectric phase and its ultrafast polarization control in a metal-organic framework*

P-40 **Keisuke Kitayama** — *Theory of electric-quadrupole shift current induced by finite-wave-vector light*

P-42 **Rajeev Kini** — *Phonon-assisted interlayer Moiré-modified hybrid excitons in alloy-binary heterostructures*

P-44 **Shu Ohmura** — *Terahertz-pulse control of charge-order polarization in photo-melted  $\alpha$ -(BEDT-TTF)<sub>2</sub>I<sub>3</sub>*

P-46 **Jiwon Jeon** — *Field-responsive equivariant machine learning potentials with long-range interactions*

P-48 **Gimin Bae** — *High-harmonic generation enhanced by electron-phonon coupling*

P-50 **Yusuke Masaki** — *Numerical simulation of circularly polarized light-induced chiral superconductivity and its controllability*