

# ISNTT2021 Symposium Oral Program

**December 13, 2021 (Monday)**

19:40 - 20:00	Opening Remarks
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## Session 1 : Spin-dependent Transport in Two-dimensional Systems

20:00 - 20:50

**S01-1 :**            **Hyperfine Mediated Transport in Semiconductor Quantum Structures**

(Plenary)

Y. Hirayama

*Tohoku University*

20:55 - 21:15

**S01-2 :**            **Electrical Evaluation of Spin-orbit Interaction Coefficients Near the Persistent Helix State in InGaAs Quantum Well**

C. Zhang, Z. Fan, Q. Liao, K. Hashimoto, S. Karube, Y. Hirayama, J. Nitta, M. Kohda

*Tohoku University*

21:15 - 21:35

**S01-3 :**            **An Electronic Half-mirror on Quantum Hall Copropagating Spin-split Edge Channels**

T. Shimizu, T. Nakamura, A. Endo, J. Ohe, S. Katsumoto

*The University of Tokyo*

21:35 - 21:55

**S01-4 :**            **Quantum Limit Transport and Two-dimensional Weyl Fermions in Epitaxial Ferromagnetic Oxide SrRuO<sub>3</sub> Thin Films**

S. Kaneta-Takada, Y. K. Wakabayashi, Y. Krockenberger, T. Nomura, Y. Kohama, H. Irie, K. Takiguchi, S. Ohya, M. Tanaka, Y. Taniyasu, H. Yamamoto

*NTT Basic Research Laboratories*

**December 14, 2021 (Tuesday)**

## Session 2 : High-frequency Dynamics in 2D Materials

03:00 - 03:30

**S02-1 :**            **Terahertz Physics of Graphene, Possibly the Most Nonlinear Material We Know**

(Invited)

D. Turchinovich

*Bielefeld University*

EST(UTC-05:00)

03:30 – 04:00

**S02-2 :**           **Valley Dynamics in Transition Metal Dichalcogenide Monolayers and Heterostructures**

(Invited)           T. Korn  
*Institut für Physik Universität Rostock*

04:00 - 04:20

**S02-3 :**           **Ultrafast Time-resolved Electrical Readout of Photocurrent in Graphene Photodetector Using On-chip THz Spectroscopy**

K. Yoshioka, T. Wakamura, M. Hashisaka, K. Watanabe, T. Taniguchi, N. Kumada  
*NTT Basic Research Laboratories*

04:20 - 04:40

**S02-4 :**           **Electron-Spin-Resonance in a Proximity-coupled MoS<sub>2</sub>/Graphene Van-der-Waals Heterostructure**

C. H. Sharma, P. Zhao, L. Tiemann, M. Prada, R. H. Blick  
*Universitt Hamburg*

04:40 - 05:00

**S02-5 :**           **Coherent Zone-Corner Acoustic Phonons in Transition Metal Dichalcogenide MoSe<sub>2</sub>**

I. Katayama, S. Bae, K. Matsumoto, M. Kitajima, K. Shudo, H. Raebiger, J. Takeda  
*Yokohama National University*

05:00 - 05:20

*Short Break*

## **December 14, 2021 (Tuesday)**

### **Session 3 : Applications of Superconducting Quantum Circuits**

05:20 - 05:50

**S03-1 :**           **Detecting Spin Fluorescence with a Microwave Photon Counter**

(Invited)           P. Bertet  
*CEA-Saclay*

05:50 - 06:20

**S03-2 :**           **A Ring Resonator-based Coupler for Enhanced Connectivity in Superconducting Multi-qubit Networks**

(Invited)           R. Vijayaraghavan  
*Tata Institute of Fundamental Research*

06:20 - 06:40

**S03-3 :**           **Josephson Traveling-wave Parametric Amplifiers with Reduced Transmission Loss and Fabrication Complexity**

C. W. S. Chang, H. Kutsuma, Y. Nakamura  
*The University of Tokyo*

EST(UTC-05:00)

EST(UTC-05:00)

06:40 - 07:00

**S03-4 :**            **Detection of Solid-state Defects Coupled to a Superconducting Qubit via Critical Current Fluctuations**  
L. V. Abdurakhimov, I. Mahboob, H. Toida , K. Kakuyanagi, Y. Matsuzaki, S. Saito  
*NTT Basic Research Laboratories*

## December 14, 2021 (Tuesday)

### Session 4 : Quantum Communication

18:30 – 19:00

**S04-1 :**            **Quantum Communications: Overcoming Practical Challenges**  
(Invited)            H.-K. Lo  
*University of Toronto / University of Hong Kong*

19:00 - 19:20

**S04-2 :**            **Securing the Source in Quantum Key Distribution**  
K. Tamaki  
*University of Toyama / NTT Basic Research Laboratories*

19:20 - 19:40

**S04-3 :**            **Hong-Ou-Mandel Interference Between Independent Light Sources for Three-photon Time-bin Entanglement**  
H. P. Lo, T. Ikuta, T. Honjo, W. J. Munro, H. Takesue  
*NTT Basic Research Laboratories*

20:00 - 22:00

Poster Session I

## December 15, 2021 (Wednesday)

### Session 5 : Topological Phenomena and Quantum Hall Physics

03:00 - 03:50

**S05-1 :**            **Dilute Magnetic Topological Insulators**  
(Plenary)            L. W. Molenkamp  
*Würzburg University*

EST(UTC-05:00)

EST(UTC-05:00)

03:55 - 04:25

**S05-2 :**            **Excitonic Nature of Magnons in a Quantum Hall Ferromagnet**

(Invited)            P. Roulleau  
*CEA Saclay*

04:25 - 04:45

**S05-3 :**            **Andreev Reflection of Fractional Quantum Hall Quasiparticles**

M. Hashisaka, T. Jonckheere, T. Akiho, S. Sasaki, J. Rech, T. Martin, K. Muraki  
*NTT Basic Research Laboratories / JST, PRESTO*

04:45 - 05:05

**S05-4 :**            **Transport Study of Topological Bands: Remarkable Feature in a  
Thermoelectric Material**

G. Eguchi , M. Taupin, M. Budnowski, A. Steiger-Thirsfeld, Y. Ishida, K. Kuroda,  
S. Shin, A. Kimura, S. Paschen  
*TU Wien*

05:05 - 05:20	<b>Short Break</b>
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## December 15, 2021 (Wednesday)

### Session 6 : Novel Qubits and Manipulations in Superconducting Circuits

05:20 - 05:50

**S06-1 :**            **Quantum Error Correction and Error-Transparent Gates on a Binomial  
Bosonic Code**

(Invited)            L. Sun  
*Tsinghua University*

05:50 - 06:20

**S06-2 :**            **Quantum Error Correction of a Qubit Encoded in Grid States of an Oscillator**

(Invited)            P. Campagne-Ibarcq  
*National Institute for Research in Digital Science and Technology*

06:20 - 06:40

**S06-3 :**            **Speed Limits for Quantum Gates with Weakly Anharmonic Qubits**

S. Ashhab, F. Yoshihara, T. Fuse, N. Yamamoto, A. Lupascu, K. Semba  
*NICT*

06:40 - 07:00

**S06-4 :**            **Enhanced Coherence of All-nitride Superconducting Qubits on a Silicon  
Substrate**

S. Kim, H. Terai, T. Yamashita, W. Qiu, T. Fuse, F. Yoshihara, S. Ashhab,  
K. Inomata, K. Semba  
*NICT*

EST(UTC-05:00)

## December 15, 2021 (Wednesday)

### Session 7 : Quantum Information Processing

18:30 - 19:00

**S07-1 :** Programmable Photonics for Quantum Information and Machine Learning

(Invited)

D. Englund

*MIT*

19:00 - 19:20

**S07-2 :** Higher-order Randomized Benchmarking

Y. Nakata, D. Zhao, T. Okuda, E. Bannai, Y. Suzuki, S. Tamiya, K. Heya, Z. Yan,  
K. Zuo, S. Tamate, Y. Tabuchi, Y. Nakamura

*The University of Tokyo / JST, PRESTO*

19:20 - 19:40

**S07-3 :** Efficient Tomography of Microwave Photonic Cluster States

Y. Sunada, S. Kono, J. Ilves, T. Sugiyama, Y. Suzuki, T. Okubo, S. Tamate,  
Y. Tabuchi, Y. Nakamura

*The University of Tokyo*

19:40 - 20:00

*Short Break*

## December 15, 2021 (Wednesday)

### Session 8 : Quantum Optics and Optical Frequency Combs

20:00 - 20:30

**S08-1 :** Scalable Semiconductor Quantum and Classical Photonics

(Invited)

J. Vučković

*Stanford University*

20:30 - 21:00

**S08-2 :** Towards a Quantum Optical Sampling Oscilloscope

(Invited)

S. A. Diddams

*NIST and University of Colorado, Boulder*

21:00 - 21:20

**S08-3 :** Thermal Control of a Kerr Microresonator Soliton Comb via an Optical Sideband

K. Nishimoto, K. Minoshima, T. Yasui, N. Kuse

*Tokushima University*

EST(UTC-05:00)

21:20 - 21:40

**S08-4 :**            **Optical Transmission Using Stokes Light**

S. Sugawara, S. Tanaka, S. Fujii, H. Kumazaki, S. Tasaka, S. Kawanishi, T. Tanabe  
*Keio University*

21:40 - 22:00

**S08-5 :**            **Frequency and Time Domain Measurements of  $^{167}\text{Er}^{3+}:\text{Y}_2\text{SiO}_5$  by Stabilizing the Optical Frequency Using a Fiber Laser Comb**

S. Yasui, M. Hiraishi, A. Ishizawa, H. Omi, R. Kaji, S. Adachi, T. Tawara  
*NTT Basic Research Laboratories / Hokkaido University*

## December 16, 2021 (Thursday)

### Session 9 : Optical Lattice Clocks and Precision Measurements

03:00 - 03:50

**S09-1 :**            **Transportable Optical Lattice Clocks to Test and Use Gravitational Redshift**

(Plenary)

H. Katori  
*The University of Tokyo / RIKEN*

03:55 - 04:15

**S09-2 :**            **Frequency Stability of a Cryogenic Silicon Optical Resonator with Crystalline Mirror Coatings**

J. Yu, T. Legero, F. Riehle, D. Nicolodi, D. Kedar, J. Robinson, E. Oelker,  
J. Ye, U. Sterr  
*PTB*

04:15 - 04:35

**S09-3 :**            **Calibrating International Time and Tracing the Frequency of NICT-Sr1 to Remote Primary Frequency Standards**

N. Nemitz, T. Gotoh, H. Ito, Y. Hanado, T. Ido, H. Hachisu  
*NICT*

## December 16, 2021 (Thursday)

05:00 - 07:00

Poster Session II

EST(UTC-05:00)

## December 16, 2021 (Thursday)

### Session 10 : Advanced Physics in Atomic-layer-engineered Graphene

18:30 - 19:20

**S10-1 :**            **The Magic of Moiré Quantum Matter**

(Plenary)

P. Jarillo-Herrero

*MIT*

19:25 - 19:45

**S10-2 :**            **Towards Scalable Growth of Hexagonal Boron Nitride/Graphene Vertical Heterostructure**

S. Wang, J. Crowther, H. Kageshima, H. Hibino, Y. Taniyasu

*NTT Basic Research Laboratories*

19:45 - 20:05

**S10-3 :**            **Observation of Flat Band in Millimeter-scale Magic-angle Twisted Bilayer Graphene**

W. Norimatsu, K. Sato, T. Ito, K. Nakagahara, K. Wakabayashi, H. Hibino

*Nagoya University*

20:05 - 20:20

*Short Break*

## December 16, 2021 (Thursday)

### Session 11 : Superconductivity and Novel Materials

20:20 - 20:50

**S11-1 :**            **Towards Ambient Superconductivity: Novel Hydrogen-Rich Materials**

(Invited)

R. Dias

*University of Rochester*

21:50 - 21:20

**S11-2 :**            **Molecular Beam Epitaxy of Novel Materials**

(Invited)

S. Stemmer

*University of California*

21:20 - 21:40

**S11-3 :**            **Growth of  $Ba_{1-x}K_xFe_2As_2$  Epitaxial Thin Films by MBE**

D. Qin, K. Iida, C. Tarantini, T. Hatano, C. Wang, Z. Guo, H. Gao, H. Saito, S. Hata, A. Yamamoto, M. Naito

*Tokyo University of Agriculture and Technology / JST CREST*

EST(UTC-05:00)

21:40 - 22:00

**S11-4 :**            **Tunnel Spectroscopy of Atomically Thin NbSe<sub>2</sub> Superconducting Films Carrying a Supercurrent**  
A. Kanda, H. Tomori, R. Yanai, L. Haoyun, M. Ishikawa, T. Taniguchi, K. Watanabe,  
M. Hayashi  
*University of Tsukuba*

## December 17, 2021 (Friday)

### Session 12 : Thermodynamics and Optics in Low-dimensional Systems

03:00 - 03:30

**S12-1 :**            **Extrinsic Thermoelectric Response of Coherent Conductors**  
(Invited)        R. Sánchez  
*Universidad Autónoma de Madrid*

03:30 - 03:50

**S12-2 :**            **Observation of Seebeck Effect in a Silicon Electron Box by Electron Counting Statistics**  
K. Chida, A. Fujiwara, K. Nishiguchi  
*NTT Basic Research Laboratories*

03:50 - 04:20

**S12-3 :**            **Single-Photon Emission from Moving Quantum Dots Driven by a Surface Acoustic Wave**  
(Invited)        C. J. B. Ford  
*University of Cambridge*

04:20 - 04:40

**S12-4 :**            **Resonance Fluorescence Dynamics of an Acoustically Modulated Quantum Dot**  
M. Weiß, D. Wigger, M. Lienhart, M. Nägele, J. Finley, T. Kuhn, P. Machnikowski,  
H. Krenner  
*Augsburg University / University of Münster*

04:40 - 05:00

**Short Break**

EST(UTC-05:00)



## December 17, 2021 (Friday)

### Session 13 : Optomechanics and Spinmechanics

05:00 - 05:30

**S13-1 :**            **Hybrid Optomechanical Systems : Coupling a Single Two-level System with a Mechanical Oscillator**

(Invited)

J.-P. Poizat

*Univ. Grenoble Alpes, CNRS*

05:30 - 06:00

**S13-2 :**            **GHz Optomechanics with Microcavity Polaritons**

(Invited)

Paulo V. Santos

*Paul-Drude-Institut für Festkörperelektronik*

06:00 - 06:20

**S13-3 :**            **Cavity-enhanced Coherent Magnon-phonon Transduction with Surface Acoustic Waves**

D. Hatanaka, M. Asano, H. Okamoto, Y. Kunihashi, H. Sanada, H. Yamaguchi

*NTT Basic Research Laboratories*

06:20 - 06:30

**Closing**