

FIRST 量子情報処理プロジェクト  
新学術領域 量子サイバネティクス  
全体会議2011  
FIRST-Quantum Information Processing Project  
Kakenhi-Quantum Cybernetics  
Annual Meeting 2011



Date: December 13 – 16, 2011  
Place: Kyoto International Hotel Nijyo-no Ma 1 & 2  
Host: NII FIRST-Quantum Information Processing Project  
Co-host: RIKEN

□Content

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## □ General Information

### <Registration>

The Registration will take place in front of the Nijyo-no-Ma 1 room on the second floor of the hotel.

• Each attendee will receive followings upon registration:

①Name badge ②Program ③Questionnaire

• Registration times:

13th 12:00~17:00      15th 8:45~17:00

14th 8:45~17:00      16th 8:45~11:30

\* If no one is at the registration desk, please kindly call following number:

080-1034-7531 (NII FIRST project Mr. Shu Katayama)

### <When leaving>

• Please return the followings.

①Name badge・・・to the designated box

②Questionnaire・・・Fill in the form and put it into the designated box.

### <Venue>

• General meeting・・・・・・2F Nijyo-no Ma 1

• Poster session・・・・・・2F Nijyo-no Ma 2

• 14th FIRST&QC Advisors' meeting・・・2F Atago-no Ma 1 (Advisor, Sub theme leader, QF Sokatsuhan member)

• 15th QF General meeting・・・・・・2F Atago-no Ma 1 (QF Sokatsuhan member)

• 16th FIRST Sub theme leaders' meeting・・・・2F Kifune-no Ma 2 (FIRST Sub theme leader)

### <Notes on conference>

• The presentation material download system is implemented in this meeting. So each attendee is requested to bring own laptop PC for download. For additional information, please refer P.6.

• Only drinking softdrink is allowed in the meeting room. Outside of the meeting room, both eating and drinking are NOT allowed.

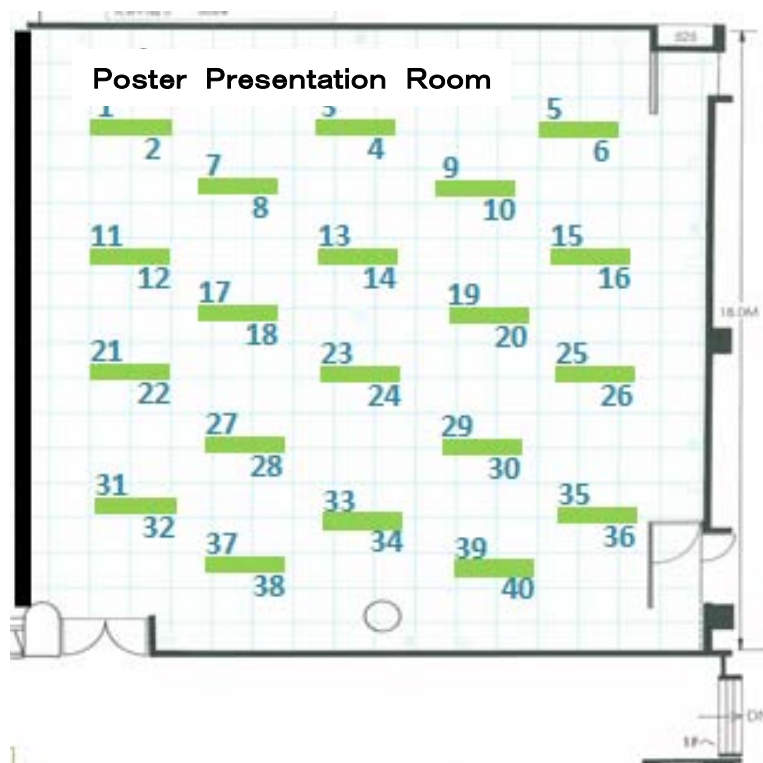
## □ Talks, Poster session

### <To speakers>

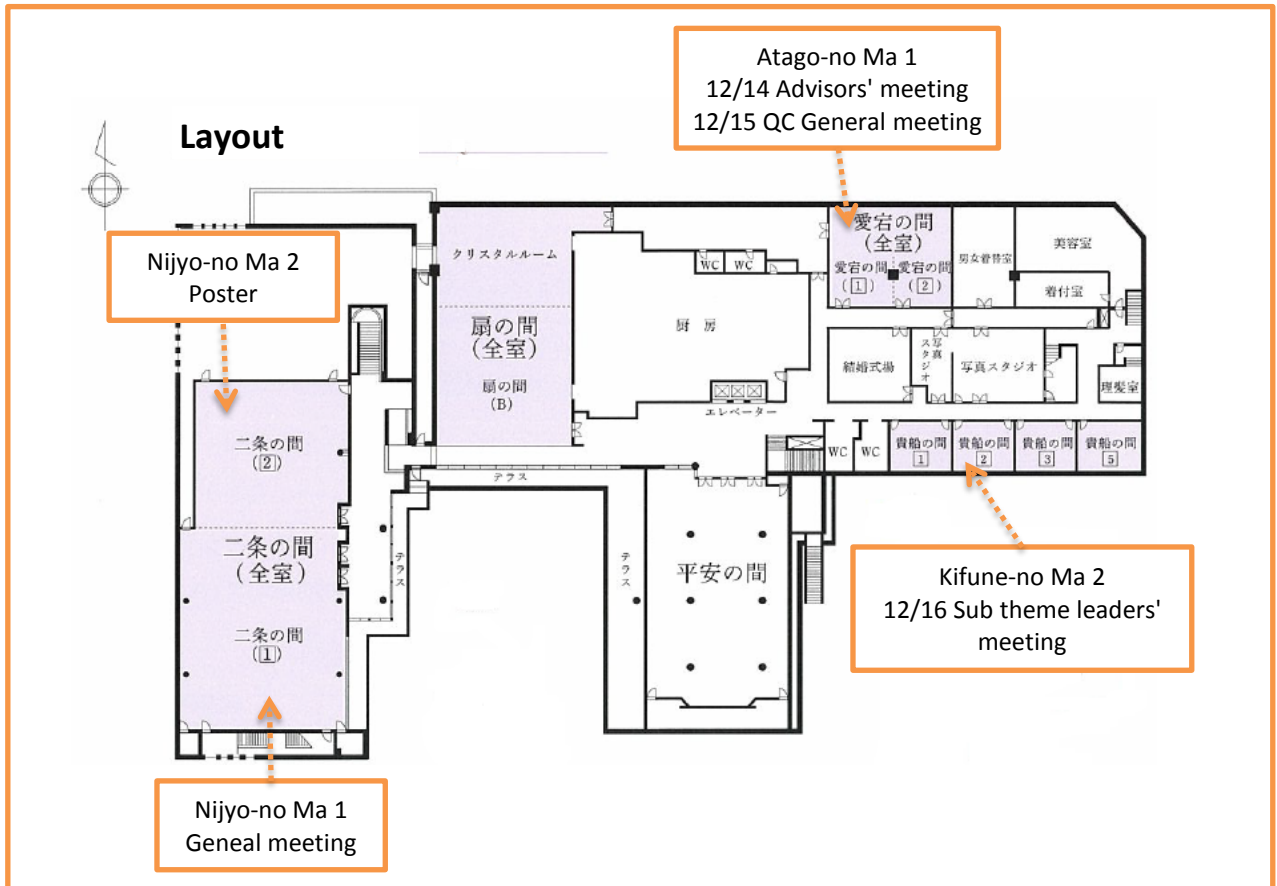
- Speakers are requested to bring the storage media containing presentation materials to the Upload desk by no later than each talk. The upload desk will be at the back of the meeting room.  
⇒ Upload procedure: P5
- A laptop PC is prepared for speakers on the stage. Each speaker's PC is also enable to use for talk.

### <Poster session>

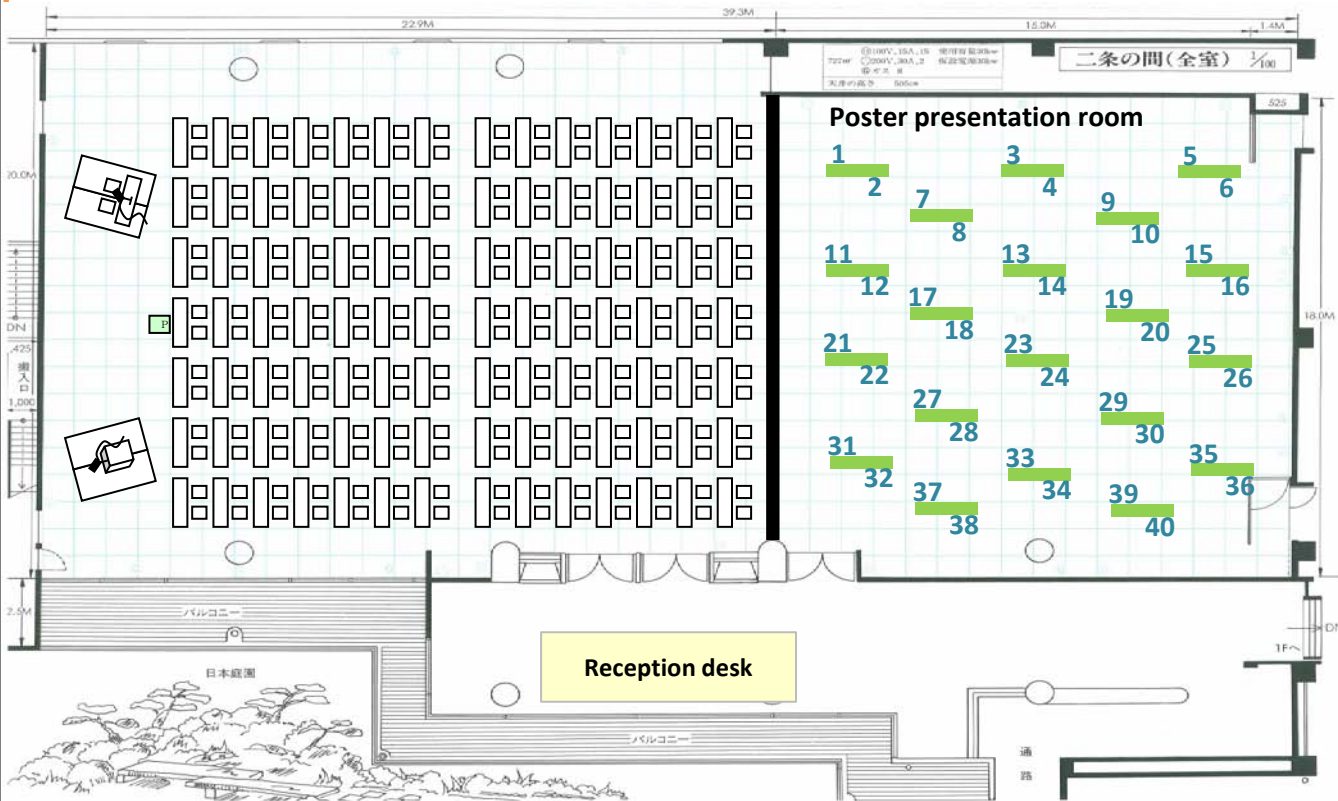
- Venue: Kyoto International Hotel 2F Nijyo-no Ma 2
- The poster board size: W900 × H1,800
- Please check your presentation date and poster number in "Poster session" page(P9-P11).
- Please put your poster on the designated board.
- The size and form of the poster will not be designated. Easy-to-read one will be preferable.
- Push pins will be provided.
- Poster session will be held during 19:30 to 21:30.
- Please put your poster on the board before the starting time.
- Please remove your poster by the next day's session.



Layout



General meeting room



□ Upload presentation materials: For speakers

<How to upload presentation materials>

- Please bring storage media: USB drive, CD-ROM or DVD, containing presentation materials to the upload desk which is located at the back of the general meeting room.
- The staff will upload your data to the server of the meeting. You may be requested to confirm the uploaded data at that time.
- After completion of the upload, "Registered card" with bar-cord will be provided. The card will be required to modify your uploading data or re-upload. Please keep it carefully during the meeting.

<Material modification/re-uploading>

- Please pass your "Registered card" and the electric media: USB thumb drive, CD or DVD, to the staff.
- The staff will make a modification/re-uploading for you. You may be requested to confirm the data.
- Please keep the "Registered card" carefully for further modification or re-uploading.



NOTE:

Though all attendees are responsible to handle the downloaded materials with extrem caution, and we made a nondisclosure agreement with the management company of this system, we recommend speakers to upload the material within permissible range. It is acceptable that speakers use the partially changed material from the one uploaded.

For question: [Please feel free to ask the staff who is at the backward of the meeting room.](#)

## □Wireless LAN setting and download presentation materials

### <Wireless LAN setting>

- Select the following access point through the wireless network list:

**SSID: annual-meeting**

**WEPKEY: kyoto**

### <Download presentation materials>

- Go to following **URL: <http://192.168.28.221/~dbf/int-nii2011.swf>**
- Download necessary presentation materials. Each file is compressed by ZIP.
- Extract the file and check if you can see.

### <Other: Internet connection>

- Please check if you can connect to the internet through your PC.



### NOTE:

Every attendee using this system is requested to handle the data with extreme caution to avoid giving speakers inconvenience.

For question: [Please feel free to ask the staff who is at the backward of the meeting room.](#)

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Schedule at a glance

Date	Time	Presenter	Title	Place
12/13 TUE	13:00 - 13:10	Welcome Speech		Njyo-no Ma 1
	13:10 - 14:30	Quantum Information Systems		
	13:10 - 13:50	Yoshihi sa Yamamoto ( NII /Stanford)	スピン量子ビットを用いた量子情報処理の将来	
	13:50 - 14:30	Shoko Utsunoriya ( NII )	注入同期レーザーを用いたイジングマシン	
	14:30 - 18:00	Quantum Measurements		
	14:30 - 15:00	Masani chi Yamani shi ( Hamamatsu Photonics)	Development of Low Dark-count Photodetector and Low Power Consumption Mid-IR Light Source	
	15:00 - 15:30	Toshi masa Fuj i sawa ( TIT)	表面弾性波フォノン共振器中の半導体量子素子	
	15:30 - 16:00	Takeshi Ota ( NTT)	半導体ナノ構造を用いた量子計測	
	16:00 - 16:30	Break		
	16:30 - 17:00	Shi geki Takeuchi ( Hokkai do U )	光子を用いた新規量子計測技術の開拓	
	17:00 - 17:30	Takuya Hirano ( Gakushui n U )	Magnetometer using spinor Bose-Einstein condensates	
	17:30 - 18:00	Tetsuya Mikai ( NTT)	Superconducting atom chips towards quantum applications	
	18:00 - 19:30	Break		
	19:30 - 21:30	Poster sessi on		
	Quantum Information Systems	Spin Quantum Computers		
	Quantum Measurements	Keiji Ono ( QC)		
Date	Time	Presenter	Title	Place
12/14 WED	9:00 - 12:00	Spin Quantum Computers		Njyo-no Ma 1
	9:00 - 9:40	Sei go Tarucha ( U of Tokyo)	量子ドットスピン量子コンピューティング	
	9:40 - 10:10	Kohei Ito ( Kei o U )	シリコン量子コンピューティング	
	10:10 - 10:40	Masahi ro Kitagawa ( Osaka U )	分子スピンを用いた量子サイバネティクスと量子コンピュータ	
	10:40 - 11:10	Break		
	11:10 - 11:20	Takeji Takui ( Osaka City U )	Molecular high spins with "tunable" zero field splitting tensors: Models affording coupling with SC qubits.	
	11:20 - 11:30	Kazunobu Sato ( Osaka City U )	Spin dynamics and state manipulation of molecular spins	
	11:30 - 11:40	Koji Maruyama ( Osaka City U )	Quantum system identification of spin networks through a small window	
	11:40 - 12:00	Yasushi Mbrita ( Osaka U )	スケーラブルな分子スピン量子コンピュータ開発のための分子系合成	
	12:00 - 14:00	Break		
	14:00 - 17:00	Superconducting Quantum Computing		
	14:00 - 14:30	Jaw-Shen Tsai ( RIKEN/NEC)	コヒーレント量子位相スリップ	
	14:30 - 15:00	Yasunobu Nakamura ( RIKEN/NEC)	超伝導量子ビットと共振器の強結合	
	15:00 - 15:30	Koi chi Senba ( NTT)	ダイヤモンド中の電子スピン集団と超伝導磁束量子ビット系で観測されたコヒーレントな量子結合」ハイブリッド量子システムの可能	
15:30 - 16:00	Break			
16:00 - 16:30	Hi deaki Takayanagi ( Tokyo U. of Science)	optical response of InAs Quantum dot-coupled SQUID		
16:30 - 16:45	Mitsuo H daka ( ISTE C)	量子ビット用微小Alジョセフソン接合の作製プロセス		
16:45 - 17:00	Masaaki Maezawa ( AIST)			
17:00 - 19:30	Break			
19:30 - 21:30	Poster sessi on		Njyo-no Ma 2	
	Superconducting Quantum Computing	FIRST/QC Advisors' Meeting		
	Anal og Quantum Computers/Quantum Simulation	Venue: Atago-no Ma 1		
	M chi yas u Mbr i ( QC)	Advisors, QIPP sub theme leaders, QC members are kindly requested to attend the meeting.		
	Nori kazu M zuochi ( QC)			



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**Schedule at a glance**

Date	Time	Presenter	Title	Place
12/15 THU	<b>9:00 - 10:00 Project Summary Report</b>			
	9:00 - 9:10	Yoshihisa Yamamoto	Roadmap	Njyo-no Ma 1
	9:10 - 9:20	Jaw-Shen Tsai	Summer School 2012	
	9:20 - 9:30	Seigo Tarucha	FIRST-QIPP Home Page	
	9:30 - 9:40	Tim Byrnes	Science Outreach	
	9:40 - 9:50	Shoko Utsunomiya	Q & A	
	9:50 - 10:00	Q & A		
	10:00 - 10:30	Break		
	<b>10:30 - 12:00 Analog Quantum Computers/Quantum Simulation</b>			
	10:30 - 11:00	Yoshiro Takahashi (Kyoto U.)	Development of Optical Lattice Quantum Simulator	Njyo-no Ma 1
	11:00 - 11:30	Shinji Urabe (Osaka University)	Caイオンを用いた量子ゲートと量子シミュレーション	
	11:30 - 12:00	Makoto Gonokami (U of Tokyo)	電子正孔系の巨視的量子状態と量子光学的機能	
	12:00 - 14:00	Break		
	<b>14:00 - 17:00 Theory</b>			
	14:00 - 14:30	Yasuhiro Tokura (NTT)	Manipulation and detection of electron charge/spin qubits	Njyo-no Ma 2
14:30 - 15:00	Franco Nori (RIKEN)	Photons interacting with superconducting qubits and resonators		
15:00 - 15:30	Masato Koashi (U of Tokyo)	On the security of differential phase-shift quantum key distribution protocols		
15:30 - 16:00	Break			
16:00 - 16:30	Rodney Van Meter (Keio U.)	Advances Toward Realizing the Surface Code	Njyo-no Ma 2	
16:30 - 17:00	Kae Nemoto (NII)			
17:00 - 19:30	Break			
19:30 - 21:30	<b>Post session</b>		<b>17:30~19:30 QC General Meeting</b>	Njyo-no Ma 2
	Theory Quantum Communication Quantum Standards Aki o Fujiwara (QC)		Venue: Atago-no Ma 1 QC Sokatsuhan members are kindly requested to attend the meeting	

Date	Time	Presenter	Title	Place	
12/16 FRI	9:00 - 9:30	Tetsuo Ogawa (Theory)	Photoinduced cooperative phenomena in electron-hole-photon systems	Njyo-no Ma 1	
	<b>9:30 - 11:30 Quantum Communications</b>				
	9:30 - 10:00	Nobuyuki Imoto (Osaka U.)	Quantum Information Processing using Photons		
	10:00 - 10:30	Masahide Sasaki (NICT)	コヒーレント状態の量子リレーと量子受信機		
	10:30 - 11:00	Akira Furusawa (U of Tokyo)	量子テレポーテーションを基礎にした量子情報処理		
	11:00 - 11:30	Hideo Kosaka (Tohoku U.)	スピンを介したエンタングルメント通信の基礎実験		
	11:30 - 13:00	Break			
	<b>13:00 - 14:30 Quantum Standards</b>				
	13:00 - 13:30	Hidetoshi Katori (U of Tokyo)	光格子時計の高精度周波数比較の展望	Njyo-no Ma 1	
	13:30 - 14:00	Feng-Lei Hong (AIST)	光格子時計と光周波数コムによる量子標準の開発		
	14:00 - 14:30	Yasuhiro Koyama (NICT)	光周波数標準の開発とその遠距離での同一性検証		
14:30 - 15:00	<b>Closing</b>			Kifune-no Ma 2	
15:00 - 18:00	<b>Sub theme leaders' meeting</b> Sub theme leaders are kindly requested to attend the meeting.				

□Poster Session

Date	No	Name	Affiliation	Title
12/13 TUE	1	Keiji Ono	RIKEN	Quantitative measurement of bi-directional nuclear spin polarization in quantum dot
	2	Michael Fraser	NII/U. of Tokyo	Superfluid hydrodynamics of a polariton condensate studied by density wave excitation
	3	Kenta Takata	NII	Benchmarking of an Ising machine based on injection-locked lasers with a learning algorithm
	4	Tomoyuki Horikiri	NII	高励起ポラリトン凝縮の研究
	5	Kusudo Kenichiro	NII	Spontaneous vortex-antivortex lattice formation in exciton-polariton condensates
	6	Timothy Byrnes	NII	The ghost Bogoliubov branch in exciton-polariton condensates
	7	Tomoya Matsukawa	U. of Tokyo	AlGaAs/GaAs半導体量子ドットにおけるゲート電圧制御AlGaAs/GaAs Gate-defined Quantum Dot
	8	Kai Yan	U.of Tokyo/NII	Dynamics of an Injection-locked laser Ising machine with a delayed feedback
	9	Natsuko Ishida	U.of Tokyo/NII	Photoluminescence of high density exciton-polariton condensates
	11	Haruka Tanji	NTT	Trapping neutral atoms with a superconducting micro-disc array
	12	Hiroimitsu Imai	NTT	Atom Interferometer on a Superconducting Atom Chip
	13	Sonia Sharmin	TIT	Modelling the triple quantum dot system with a RF_QPC circuit
	14	Sawako Sekine	Gakushuin U.	Measurement of Larmor precession in spin-2 Bose-Einstein condensates
	15	Yuta Masuyama	Gakushuin U.	Mixing dynamics of binary 87Rb Bose-Einstein condensates in an optical trap
	16	Mark Sadgrove	Gakushuin U.	Prospects for Precision Measurements using a Spinor Bose-Einstein Condensate
	17	Masayuki Hashisaka	TIT	量子ホール端状態における電子ダイナミクス
	18	Kazuhiwa Washio	TIT	量子ドットを用いた非定常量子ホール端状態のエネルギー・時間分解測定
	19	Tadataka Edamura	Hamamatsu Photonics	Development of low power-consumption Mid-IR light sources (消費電力中赤外光源の開発)
	20	Toru Hirohata	Hamamatsu Photonics	Development of Low Dark-count Photodetector
	21	Takafumi Ono	Hokkaido U.	もつれ合い光子の微分干渉計への応用~もつれ合い顕微鏡実現に向けて~
	22	Pierre-Andre Mortemousque	Keio University	Photoluminescence Study of Bismuth Donor in Isotopically Controlled Silicon.
	23	Akhtar Mohammad Waseem	Keio University	Coherent state swapping between photoexcited triplet electron spin and 29Si nuclear spin in silicon
	24	Yap Yung Szen	Osaka University	A Sensitive K-u Band Probe
	25	Yutaka Tabuchi	Osaka University	最適化パルスシーケンスによる電子スピン状態の制御
	26	Takahisa Tanaka	Keio University	Characterization of high mobility 2DEG in Si/SiGe
	27	Takeharu Sekiguchi	Keio University	Host isotope mass effect on the hyperfine interaction of 31P donor in Si
	28	Tomohiro YOSHINO	Osaka City U.	Characterization of DPNO derivatives as molecular spin-bus qubits
	29	Moeko Kawamori	Osaka City U.	Zero-field splitting tensor of nitroxide-substituted iminonitroxide and analysis of the double quantum transition

□ Poster Session

Date	No	Name	Affiliation	Title	
12/13 TUE	30	Kazuki Ayabe	Osaka City U.	A Study of CW-ESR and Pulsed Electron Spin Transient Nutation Spectroscopy for Weakly Exchange-Coupled Two-Qubit Biradical Systems	
	31	Mikito Nozaki	Osaka City U.	A weakly exchange-coupled multi-radical in the rigid-squarephthalocyanine molecular frame:A model for a two-dimensional quantum spin array with competing hyperfine interactions	
	32	Satoru Yamamoto	Osaka City U.	Structure determination of spin-labeled DNA's	
	33	Ayaka Tanaka	Osaka City U.	Nuclear Spin Manipulation of Isotope-labeled Diphenylnitroxide by Pulsed ELDOR-NMR Technique	
	34	Shigeaki Nakazawa	Osaka City U.	Molecular design for biradical and triradical qubits and quantum gate operations by pulsed ESR spectroscopy	
	35	Kenji Sugisaki	Osaka City U.	The state-of-the-art ab initio study of the zero-field splitting tensors of organic biradicals	
	36	Kenichiro Tateishi	Osaka U.	DNP with photoexcited triplet electrons in thin film	
	37	Akinori Kagawa	Osaka U.	Efficiency improvement in dynamic nuclear polarization using triplet electron spins for quantum computing	
	38	Makoto Negoro	Osaka U.	QND Measurement with Spin Amplification	
	39	Tomohiro Otsuka	U. of Tokyo	Speeding up single electron spin rotations in semiconductor quantum dots	
	40	Akira Oiwa	U. of Tokyo	Electron spin resonance and quantum dots in g-factor controlled GaAs-based quantum wells	
41	Takafumi Fujita	U. of Tokyo	Discrimination of Single Photo-generated Electrons using inter-dot Tunneling in a Double Quantum Dot		
Date	No	No	Name	Title	
12/14 WED	1		Norikazu Mizuochi	Osaka U.	Study of single NV center in diamond toward multi-qubit system
	2		Michiyasu Mori	Japan Atomic Energy Agency	超伝導接合中の磁壁運動と輸送特性
	3		Bhaskar Kaviraj	International Center for Materials Nanoarchitectonics (MANA)	Optical Properties of SQUIDS based on self-assembled InAs Quantum Dots
	4		Yuichiro Matsuzaki	NTT	Entangling unstable optically active matter qubits
	5		Shiro Saito	NTT	超伝導磁束量子ビットとスピン集団のコヒーレント結合
	6		Kosuke Kakuyanagi	NTT	JBA読み出し法による超伝導磁束量子ビットの量子フィードバックの実現に向けて
	7		Kunihiro Inomata	RIKEN	Flux qubit strongly coupled to a superconducting resonator capacitively
	8		Fumiki Yoshihara	RIKEN	flux noise spectroscopy from decay of Rabi oscillations in a strongly driven flux qubit
	9		Zihui Peng	RIKEN	Fast generation of multi-particle entangled state for flux qubits in a circle array of transmission line resonators with tunable coupling
	10		Yuri Pashkin	RIKEN	Charge qubit coupled to a nanomechanical resonator
	11		Miyazaki Toshiyuki	RIKEN	Distributed measurement system with virtual device drivers
	12		Shintaro Taie	Kyoto U.	Mott Insulator of Multi-Component Fermi Gases of Ytterbium in Optical Lattices
	13		Shuta Nakajima	Kyoto U.	Ultracold Yb-Li atomic mixtures towards realization of a quantum simulator for impurity problems
	14		Ryotaro Inoue	Kyoto U.	Measurement-based quantum feedback control of atomic collective spin state
	15		Atsushi Noguchi	Osaka U.	RFD レスト状態を用いた デコヒーレンスフリーエンタングルメント状態の生成
	16		Yusuke Tateishi	Osaka U.	Toward quantum simulations of Jaynes-Cummings Hubbard model with trapped ions
	17		Kazuki Koda	Osaka U.	Shuttling of ions in a segmented surface trap

□ Poster Session

Date	No	Name	Affiliation	Title
12/14 VED	18	Yuki Ibaraki	Osaka U.	Development of a surface trap for two dimensional ion array
	19	Kosuke Yoshioka	U. of Tokyo	バルク半導体励起子のボース・アインシュタイン凝縮転移
	20	Junko Omachi	U. of Tokyo	ストリークカメラによる時間領域光子相関測定: 半導体レーザーの高速緩和振動
	21	Michael Fraser	NII/U. of Tokyo	Vortex lattice formation and melting in a polariton condensate
	22	Naoyuki Masumoto	U. of Tokyo/NII	2次元カゴメ格子中の励起子ポラリトンの局在
	23	Kensuke Inaba	NTT	Generation of the cluster state of ultracold fermionic atoms in an optical lattice
	24	Shikano Yutaka	TIT	Recent Progress of Weak Value
Date	No	Name	Affiliation	Title
12/15 THU	1	Akio Fujiwara	Osaka U.	Experimental verification of adaptive quantum estimation
	2	Obata Toshiaki	U. of Tokyo	スピキュビットにおけるデコヒーレンス問題と情報伝達
	3	Toshihiro Kubo	NTT	Backaction dephasing by quantum dot charge detector
	4	Makoto Yamashita	NTT	Strongly interacting array of Bose-Einstein condensates trapped in a one-dimensional optical lattice
	5	Nobuyuki Matsuda	NTT	Full integration of polarization-entangled photon pair source on a silicon-on-insulator substrate
	6	Shota Nagayama	Keio U.	Surface Code Quantum Computation on a Defective Physical Lattice
	7	Makoto Yamaguchi	Osaka U.	半導体レーザーと共振器ポラリトン凝縮を接続する理論
	8	Kenji Kamide	Osaka U.	Fano-resonance gain by dephasing electron-hole Cooper pairs in semiconductor lasers
	9	Daisuke Akamatsu	AIST	産総研におけるSr/Ybデュアル光格子時計の開発
		Masami Yasuda	AIST	
	10	Hidekazu Hachisu	NICT	光ファイバリンクによる遠距離光格子時計の直接周波数比較
	11	Tetsuya Ido	NICT	単純円筒型光共振器のハイブリッド光学除振法
	12	Ichirou Ushijima	U. of Tokyo	低温動作Sr光格子時計の開発
	13	Kazuhiro Yamanaka	U. of Tokyo	水銀光格子時計実現に向けた光格子用紫外レーザーの開発
	14	Tetsushi Takano	U. of Tokyo	87Sr-88Sr光格子時計の同位体シフト測定
	15	Masao Takamoto	RIKEN	Frequency comparison of optical lattice clocks near the quantum limit
	16	Yujiro Eto	NICT	波形整形を利用したピコ秒パルス光スクイーミングの高効率ホモダイン検出
	17	Makoto Ando	Osaka U.	可視・通信波長域のエンタングル光子対生成実験
	18	Rikizo Ikuta	Osaka U.	Wide-band quantum interface for visible-to-telecommunication wavelength conversion
	19	Hidetoshi Kumagai	Osaka U.	On the robustness of quantum communication based on decoherence-free subspace using counter propagating weak laser light
	20	Keisuke Fujii	Osaka U.	A distributed architecture for scalable quantum computation with realistically noisy devices
	21	Kenzo Makino	U. of Tokyo	アダプティブ光位相推定の研究
	22	Takahiro Mizuta	U. of Tokyo	光子除去操作における量子モードフィルタリング
	23	Naofumi Abe	Tohoku U.	Coherent transfer of time-bin photons to electron spins in a semiconductor
24	Yao Dahai	Tohoku U.	Electron spin state tomography with coherent Kerr effect	