

# **TCP2014**

**Friday 28 November 2014 - Friday 05 December 2014**

## **Book of abstracts**

# Table of contents

Opening .....	1
Optical sideband cooling of an ion to the ground state of its motion in a Penning trap .....	1
Basics of antimatter science .....	1
What (anti-)matters with antimatter? .....	1
Two-photon laser spectroscopy of antiprotonic Helium and antiproton-to-electron mass ratio .....	1
Present status of the AEGIS Experiment and prospect for cooling antiprotons. ....	1
Experiments with highly charged ions at HITRAP .....	1
Deceleration and storage of highly charged ions and antiprotons at GSI/FAIR .....	2
CHIP-TRAP: A high-precision double Penning trap mass spectrometer for stable and long-lived radioactive isotopes .....	2
Mass measurements of rare isotopes with a single ion .....	2
Current status of the TAMUTRAP facility .....	2
First direct high-precision measurement of the magnetic moment of the proton and status of BASE .....	2
The GBAR antimatter gravity experiment .....	2
Antiproton cloud radial compression in the ALPHA apparatus at CERN .....	2
Antihydrogen annihilation vertex detection in the ALPHA experiment .....	3
A spectroscopy beamline for the hyperfine structure of antihydrogen and its characterization with a Hydrogen beam .....	3
Beta-decay of highly-charged ions .....	3
Precision mass measurements of short-lived nuclides at storage ring in Lanzhou .....	3
Rare-RI ring at RIKEN RI Beam Factory .....	3
Laser-based tests of fundamental symmetries and interactions at the ESR .....	3
The SCRIT electron scattering facility .....	3
Low energy storage rings for molecular physics .....	4
RIKEN's new cryogenic electrostatic ion storage ring for atomic and molecular physics: RICE .....	4
Rapid cooling of isolated small carbon cluster anions .....	4
A new approach to the particle position detection in a storage ring .....	4
Overview on MRTOF mass spectrometry .....	4
First direct mass measurements with the MR-TOF-MS at the FRS ion catcher .....	4

Multi-reflection time-of-flight mass separation and spectrometry at ISOLTRAP/ISOLDE .....	4
High-precision mass measurements of trans-Uranium nuclei by MRTOF-MS: shifting the paradigm in SHE-identification .....	5
Polyanion production in Penning and RFQ ion traps .....	5
The MR-TOF isobar separator for the TITAN facility at TRIUMF .....	5
muon's g-2 experiment at J-PARC .....	5
Measuring the electron's electric dipole moment in a trapped molecular ion. ....	5
Quantum state preparation of single molecular ions .....	5
The ASACUSA CUSP experiment .....	5
Sensitive detection of modes and quantum simulation ith 2D arrays of trapped ions .....	6
Fundamental physics with the ALPHA antihydrogen trap .....	6
A new hydrogenic atom, e+H .....	6
The high precision mass spectrometer-SMILETRAP meets an EBIT in Shanghai .....	6
Spectroscopic studies of highly charged ions at the Tokyo electron beam ion trap facility .....	6
Coulomb-crystalized highly charged ions .....	6
Using GPU parallelization to perform realistic simulations of the LPCTrap experiments : from a trapped ion cloud to a time-of-flight measurement. ....	6
Status of the ReA Electron Beam Ion Trap Charge Breeder at NSCL .....	7
Dynamical effects in the X-ray transition strengths of astrophysically relevant Fe16+ ions .....	7
High-resolution intensity ratio measurements in EUV spectral wavelength for ions of astrophysical ineterst ..	7
Parity violation measurements in trapped single radium ions .....	7
Ba-ion extraction from high-pressure Xe gas for double-beta decay studies with nEXO .....	7
Fundamental physics with highly charged ions at low energies .....	7
Magneto-optical trapping of radioactive atoms for test of the fundamental symmetries .....	7
BASE - High-precision tests of CPT invariance using antiprotons .....	8
muon's g-2 experiment at Fermi-lab. ....	8
Scalable quantum information processing with trapped ions at NIST .....	8
Engineering and observation of interacting quasiparticles in a trapped-ion many-body system .....	8
Development of the quantum repeater based on trapped Ions .....	8
The g-factor of highly charged ions – Stress test for the Standard Model and access to the mass of the electron	8
PI-ICR technique for mass measurements on short-lived nuclides and the PENTATRAP project .....	8
Highly charged ions for atomic clocks and search for variation of the fine structure constant .....	9
Laser spectroscopy of atoms in superfluid helium for the measurement of nuclear spins and electromagnetic moments of radioisotope atoms .....	9
Quantum simulation of the Jaynes-Cummings-Hubbard Model using trapped ions .....	9

Extreme field physics in Penning traps .....	9
Quadratic Zeeman effect in highly charged ions .....	9
Precision $\beta$ -decay experiments with the $\beta$ -decay Paul Trap .....	9
Precision measurements with LPCTrap at GANIL .....	9
A new correlation Penning trap for fundamental physics at Texas A&M .....	10
Ion trap and laser cooling spectroscopy for isotope analysis .....	10
Gas-cell beam cooler-buncher for low-energy experiments at SLOWRI .....	10
Probing exotic nuclei through mass measurements from ISOLTRAP .....	10
TITAN: The ion trapping program at TRIUMF .....	10
Penning trap mass spectrometry at the LEBIT facility .....	10
The Canadian Penning trap mass spectrometer at CARIBU .....	10
On-going developments and measurements at JYFLTRAP .....	11
Recent developments for investigations of the heaviest elements with SHIPTRAP .....	11
High-precision Penning-trap mass measurements at TRIGA-TRAP .....	11

97

## Opening

98

## Optical sideband cooling of an ion to the ground state of its motion in a Penning trap

99

## Basics of antimatter science

session1 / 100

### What (anti-)matters with antimatter?

Corresponding Author: yasunori@riken.jp

session1 / 101

### Two-photon laser spectroscopy of antiprotonic Helium and antiproton-to-electron mass ratio

Corresponding Author: masaki.hori@mpq.mpg.de

session1 / 102

### Present status of the AEGIS Experiment and prospect for cooling antiprotons.

Corresponding Author: daniel.comparat@u-psud.fr

session1 / 103

### Experiments with highly charged ions at HITRAP

Corresponding Author: z.andjelkovic@gsi.de

session1 / 104

## **Deceleration and storage of highly charged ions and antiprotons at GSI/FAIR**

Corresponding Author: f.herfurth@gsi.de

session1 / 105

## **CHIP-TRAP: A high-precision double Penning trap mass spectrometer for stable and long-lived radioactive isotopes**

Corresponding Author: redsh1m@cmich.edu

session1 / 106

## **Mass measurements of rare isotopes with a single ion**

Corresponding Author: eibach@nscl.msu.edu

session1 / 107

## **Current status of the TAMUTRAP facility**

Corresponding Author: mehlmanmichael@gmail.com

session2 / 108

## **First direct high-precision measurement of the magnetic moment of the proton and status of BASE**

Corresponding Author: stefan.ulmer@cern.ch

session2 / 109

## **The GBAR antimatter gravity experiment**

Corresponding Author: patrice.perez@cea.fr

session2 / 110

## **Antiproton cloud radial compression in the ALPHA apparatus at CERN**

Corresponding Author: andrea.gutierrez@triumf.ca

session2 / 111

## **Antihydrogen annihilation vertex detection in the ALPHA experiment**

Corresponding Author: petteri.pusa@cern.ch

session2 / 112

## **A spectroscopy beamline for the hyperfine structure of antihydrogen and its characterization with a Hydrogen beam**

Corresponding Author: martin.simon@oeaw.ac.at

session1 / 113

## **Beta-decay of highly-charged ions**

Corresponding Author: y.litvinov@gsi.de

session1 / 114

## **Precision mass measurements of short-lived nuclides at storage ring in Lanzhou**

Corresponding Author: yhzhang@impcas.ac.cn

session1 / 115

## **Rare-RI ring at RIKEN RI Beam Factory**

Corresponding Author: yamaguch@ribf.riken.jp

session1 / 116

## **Laser-based tests of fundamental symmetries and interactions at the ESR**

Corresponding Author: wnoertershaeuser@ikp.tu-darmstadt.de

session1 / 117

## **The SCRIT electron scattering facility**

Corresponding Author: wakasugi@riken.jp

session1 / 118

## **Low energy storage rings for molecular physics**

Corresponding Author: schmidt@fysik.su.se

session1 / 119

## **RIKEN's new cryogenic electrostatic ion storage ring for atomic and molecular physics: RICE**

Corresponding Author: toshiyuki-azuma@riken.jp

session1 / 120

## **Rapid cooling of isolated small carbon cluster anions**

Corresponding Author: takeshi@tmu.ac.jp

session1 / 121

## **A new approach to the particle position detection in a storage ring**

Corresponding Author: cxc@impcas.ac.cn

session2 / 122

## **Overview on MRTOF mass spectrometry**

session2 / 123

## **First direct mass measurements with the MR-TOF-MS at the FRS ion catcher**

Corresponding Author: wolfgang.r.plass@exp2.physik.uni-giessen.de

session2 / 124

## **Multi-reflection time-of-flight mass separation and spectrometry at ISOLTRAP/ISOLDE**

Corresponding Author: wolf@uni-greifswald.de



session2 / 125

**High-precision mass measurements of trans-Uranium nuclei by MRTOF-MS: shifting the paradigm in SHE-identification**

Corresponding Author: schury@riken.jp

session2 / 126

**Polyanion production in Penning and RFQ ion traps**

Corresponding Author: lschweik@physik.uni-greifswald.de

session2 / 127

**The MR-TOF isobar separator for the TITAN facility at TRIUMF**

Corresponding Author: t.dickel@gsi.de

session1 / 128

**muon's g-2 experiment at J-PARC**

session1 / 129

**Measuring the electron's electric dipole moment in a trapped molecular ion.**

session1 / 130

**Quantum state preparation of single molecular ions**

session1 / 131

**The ASACUSA CUSP experiment**

Corresponding Author: kuroda@radphys4.c.u-tokyo.ac.jp

session1 / 132

## **Sensitive detection of modes and quantum simulation with 2D arrays of trapped ions**

session1 / 133

## **Fundamental physics with the ALPHA antihydrogen trap**

Corresponding Author: makoto.fujiwara@triumf.ca

session1 / 134

## **A new hydrogenic atom, $e+H$**

Corresponding Author: codys@yorku.ca

session1 / 135

## **The high precision mass spectrometer-SMILETRAP meets an EBIT in Shanghai**

Corresponding Author: keyao@fudan.edu.cn

session1 / 136

## **Spectroscopic studies of highly charged ions at the Tokyo electron beam ion trap facility**

Corresponding Author: n\_nakamu@ils.uec.ac.jp

session1 / 137

## **Coulomb-crystallized highly charged ions**

Corresponding Author: o.versolato@arcnl.nl

session1 / 138

## **Using GPU parallelization to perform realistic simulations of the LPCTrap experiments : from a trapped ion cloud to a time-of-flight measurement.**

Corresponding Author: fabian@lpccaen.in2p3.fr

session1 / 139

### **Status of the ReA Electron Beam Ion Trap Charge Breeder at NSCL**

Corresponding Author: baumann@nscl.msu.edu

session1 / 140

### **Dynamical effects in the X-ray transition strengths of astrophysically relevant Fe<sup>16+</sup> ions**

Corresponding Author: natalia.oreshkina@mpi-hd.mpg.de

session1 / 141

### **High-resolution intensity ratio measurements in EUV spectral wavelength for ions of astrophysical interest**

Corresponding Author: safdaruetian@gmail.com

session2 / 142

### **Parity violation measurements in trapped single radium ions**

session2 / 143

### **Ba-ion extraction from high-pressure Xe gas for double-beta decay studies with nEXO**

Corresponding Author: tbrunner@stanford.edu

session2 / 144

### **Fundamental physics with highly charged ions at low energies**

Corresponding Author: shabaev@pcqnt1.phys.spbu.ru

session2 / 145

### **Magneto-optical trapping of radioactive atoms for test of the fundamental symmetries**

Corresponding Author: kawamura.hirokazu@gmail.com

session2 / 146

**BASE - High-precision tests of CPT invariance using antiprotons**

Corresponding Author: christian.smorra@cern.ch

session2 / 147

**muon's g-2 experiment at Fermi-lab.**

session3 / 148

**Scalable quantum information processing with trapped ions at NIST**

Corresponding Author: dil@boulder.nist.gov

session3 / 149

**Engineering and observation of interacting quasiparticles in a trapped-ion many-body system**

Corresponding Author: christian.roos@uibk.ac.at

session3 / 150

**Development of the quantum repeater based on trapped Ions**

session1 / 151

**The g-factor of highly charged ions – Stress test for the Standard Model and access to the mass of the electron**

session1 / 152

**PI-ICR technique for mass measurements on short-lived nuclides and the PENTATRAP project**

Corresponding Author: sergey.eliseev@mpi-hd.mpg.de

session1 / 153

## Highly charged ions for atomic clocks and search for variation of the fine structure constant

Corresponding Author: v.dzuba@unsw.edu.au

session1 / 154

## Laser spectroscopy of atoms in superfluid helium for the measurement of nuclear spins and electromagnetic moments of radioisotope atoms

Corresponding Author: tomomi.fujita@riken.jp

session1 / 155

## Quantum simulation of the Jaynes-Cummings-Hubbard Model using trapped ions

Corresponding Author: toyoda@ee.es.osaka-u.ac.jp

session1 / 156

## Extreme field physics in Penning traps

Corresponding Author: m.vogel@gsi.de

session1 / 157

## Quadratic Zeeman effect in highly charged ions

Corresponding Author: glazov.d.a@gmail.com

session10 / 158

## Precision $\beta$ -decay experiments with the $\beta$ -decay Paul Trap

Corresponding Author: mgrants@uw.edu

session10 / 159

## Precision measurements with LPCTrap at GANIL

Corresponding Author: lienard@lpccaen.in2p3.fr

session10 / 160

**A new correlation Penning trap for fundamental physics at Texas A&M**

Corresponding Author: [dmelconian@physics.tamu.edu](mailto:dmelconian@physics.tamu.edu)

session10 / 161

**Ion trap and laser cooling spectroscopy for isotope analysis**

Corresponding Author: [hasegawa@n.t.u-tokyo.ac.jp](mailto:hasegawa@n.t.u-tokyo.ac.jp)

session10 / 162

**Gas-cell beam cooler-buncher for low-energy experiments at SLOWRI**

Corresponding Author: [yito@riken.jp](mailto:yito@riken.jp)

session3 / 163

**Probing exotic nuclei through mass measurements from ISOLTRAP**

Corresponding Author: [skreim@cern.ch](mailto:skreim@cern.ch)

session3 / 164

**TITAN: The ion trapping program at TRIUMF**

Corresponding Author: [aniak@triumf.ca](mailto:aniak@triumf.ca)

session3 / 165

**Penning trap mass spectrometry at the LEBIT facility**

Corresponding Author: [ringle@nscl.msu.edu](mailto:ringle@nscl.msu.edu)

session3 / 166

**The Canadian Penning trap mass spectrometer at CARIBU**

Corresponding Author: [jclark@phy.anl.gov](mailto:jclark@phy.anl.gov)

session3 / 167

## **On-going developments and measurements at JYFLTRAP**

Corresponding Author: [tommi.eronen@jyu.fi](mailto:tommi.eronen@jyu.fi)

session3 / 168

## **Recent developments for investigations of the heaviest elements with SHIPTRAP**

Corresponding Author: [m.block@gsi.de](mailto:m.block@gsi.de)

session3 / 169

## **High-precision Penning-trap mass measurements at TRIGA-TRAP**

Corresponding Author: [szilard.nagy@mpi-hd.mpg.de](mailto:szilard.nagy@mpi-hd.mpg.de)