

14th International Workshop on Slow Positron Beam Techniques and Applications 2016 (SLOPOS14)

Journal of Physics: Conference Series Volume 791

Matsue, Japan
22 – 27 May 2016

Editors:

**Masanori Fujinami
Yasuyuki Nagashima
Brian E. O'Rourke**

ISBN: 978-1-5108-3693-8
ISSN: 1742-6588

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by the Institute of Physics
All rights reserved. The material featured in this book is subject to
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of contents

Volume 791

14th International Workshop on Slow Positron Beam Techniques & Applications
22–27 May 2016, Matsue, Japan

Accepted papers received: 8 December 2016
Published online: 22 February 2017

Preface

011001

OPEN ACCESS

[14th International Workshop on Slow Positron Beam Techniques & Applications](#)

011002

OPEN ACCESS

[Peer review statement](#)

Papers

012001

OPEN ACCESS

[Symphonic use of quantum beams for materials science -now and future-](#)

K Yamada and H Hiraka.....1

012002

OPEN ACCESS

[Present and future experiments using bright low-energy positron beams](#)

Christoph Hugenschmidt.....6

012003

OPEN ACCESS

[Research progress at the Slow Positron Facility in the Institute of Materials Structure Science, KEK](#)

T Hyodo, K Wada, I Mochizuki, M Kimura, N Toge, T Shidara, Y Fukaya, M Maekawa, A Kawasuso, S Iida, K Michishio and Y Nagashima.....14

012004

OPEN ACCESS

[Positron annihilation lifetime spectroscopy at a superconducting electron accelerator](#)

A Wagner, W Anwand, A G Attallah, G Dornberg, M Elsayed, D Enke, A E M Hussein, R Krause-Rehberg, M O Liedke, K Potzger and T T Trinh.....22

012005

OPEN ACCESS

[Efficient positron moderation with a commercial 4H-SiC epitaxial layer](#)

A M M Leite, P Debu, P Pérez, J-M Reymond, Y Sacquin, B Vallage and L Liskay.....28

012006

OPEN ACCESS

[Micrometer positron beam characterization at the Scanning Positron Microscope Interface](#)

J Mitteneder, M Dickmann, G Kögel, W Egger, P Sperr and G Dollinger.....32

012007

OPEN ACCESS

[Study on Bose-Einstein condensation of positronium](#)

K Shu, T Murayoshi, X Fan, A Ishida, T Yamazaki, T Namba, S Asai, K Yoshioka, M Kuwata-Gonokami, N Oshima, B E O'Rourke and R Suzuki.....36

012008

OPEN ACCESS

[Low energy positron beam system for the investigation of 2D and porous materials](#)

M D Chrysler, V A Chirayath, A D McDonald, R W Gladen, A J Fairchild, A R Koymen and A H Weiss.....40

012009

OPEN ACCESS

[Construction of a surface positronium lifetime spectroscopy apparatus with a spin-polarized low energy positron beam](#)

M Maekawa, K Wada, A Miyashita and A Kawasuso.....46

012010

OPEN ACCESS

[Design and simulation of a pulsed positron beam at ELI-NP](#)

N Djourelov and D Dinescu.....51

012011

OPEN ACCESS

[Status of the project for a positron laboratory at ELI-NP](#)

N Djourelov, A Oprisa, D Dinescu and V Leca.....55

012012

OPEN ACCESS

[Evaluation of the optical performance of a brightness enhancement system developed for the KUR slow positron beamline](#)

Yoshihiro Kuzuya, Nagayasu Oshima, Atsushi Kinomura, Atsushi Yabuuchi, Koichi Sato and Qiu Xu.....59

012013

OPEN ACCESS

[Evaluation of a positron-beam-pulsing system in KUR reactor-based positron beam facility](#)

A Yabuuchi, A Kinomura, Y Kuzuya, K Sato, Q Xu, N Oshima and B E O'Rourke.....63

012014

OPEN ACCESS

[The AEGIS experiment at CERN: measuring antihydrogen free-fall in earth's gravitational field to test WEP with antimatter](#)

R S Brusa, C Amsler, T Ariga, G Bonomi, P Bräunig, L Cabaret, M Caccia, R Caravita, F Castelli, G Cerchiari, D Comparat, G Consolati, A. Demetrio, L Di Noto, M Doser, A

Ereditato, C Evans, R Ferragut, J Fesel, A Fontana, S Gerber, M Giammarchi, A Gligorova, F Guatieri, S Haider, H Holmestad, T Huse, A Kellerbauer, D Krasnický, V Lagomarsino, P Lansonneur, P Lebrun, C Malbrunot, S Mariazzi, V Matveev, Z Mazzotta, G Nebbia, P Nedelec, M Oberthaler, N Pacifico, D Pagano, L Penasa, V Petracek, C Pistillo, F Prelz, M Prevedelli, L Ravelli, B Rienaecker, O M Røhne, A Rotondi, M Sacerdoti, H Sandaker, R Santoro, P Scampoli, L Smestad, F Sorrentino, I M Strojek, G Testera, I C Tietje, S Vamosi, E Widmann, P Yzombard, J Zmeskal and N Zurlo.....67

012015

OPEN ACCESS

[Effects of vibrational anharmonicity and inter-mode couplings on the binding energy of a positron to molecules](#)

Y Kita and M Tachikawa.....75

012016

OPEN ACCESS

[Advanced characterization of lithium battery materials with positrons](#)

Bernardo Barbiellini and Jan Kuriplach.....80

012017

OPEN ACCESS

[Point defects in ZnO crystals grown by various techniques](#)

J Čížek, M Vlček, P Hruška, F Lukáč, O Melikhova, W Anwand, F Selim, Ch Hugenschmidt and W Egger.....86

012018

OPEN ACCESS

[Positron annihilation study of cavities in black Au films](#)

O Melikhova, J Čížek, P Hruška, M Vlček, I Procházka, W Anwand, M Novotný and J Bulíř.....92

012019

OPEN ACCESS

[Investigation of point defects in HfO₂ using positron annihilation spectroscopy: internal electric fields impact](#)

M Alemany, A Chabli, E Oudot, F Pierre, P Desgardin, F Bertin, M Gros-Jean and M F Barthe.....96

012020

OPEN ACCESS

[Slow positron beam studies of zirconium exposed to dry sliding](#)

Jerzy Dryzek and Pawel Horodek.....102

012021

OPEN ACCESS

[New insights into the nanostructure of innovative thin film solar cells gained by positron annihilation spectroscopy](#)

S W H Eijt, W Shi, A Mannheim, M Butterling, H Schut, W Egger, M Dickmann, C Hugenschmidt, B Shakeri, R W Meulenberg, V Callewaert, R Saniz, B Partoens, B Barbiellini, A Bansil, J Melskens, M Zeman, A H M Smets, M Kulbak, G Hodes, D Cahen and E Brück.....106

012022

OPEN ACCESS

[Structure of nitride layer formed on titanium alloy surface by N₂-gas exposure at high temperatures](#)

Y Takeda, K Iida, S Sato, T Matsuo, Y Nagashima, N Okubo, K Kondo and T Hirade.....112

012023

OPEN ACCESS

[Prediction of positron-annihilation parameters for vacancy-type defects in ternary alloy semiconductors by data-scientific approach](#)

Shoji Ishibashi, Hiori Kino, Akira Uedono, Takashi Miyake and Kiyoyuki Terakura.....116

012024

OPEN ACCESS

[Positron beam studies of saponite film prepared by precipitation method](#)

K Numata, K Sato, K Fujimoto and K Ito.....121

012025

OPEN ACCESS

[Antifouling enhancement of polysulfone/TiO₂ nanocomposite separation membrane by plasma etching](#)

Z Chen, C Yin, S Wang, K Ito, Q M Fu, Q R Deng, P Fu, Z D Lin and Y Zhang.....125

012026

OPEN ACCESS

[Degradation of electron-irradiated polyethylene studied by positron annihilation lifetime spectroscopy](#)

K Onodera, T Oka, Y Kino and T Sekine.....129

012027

OPEN ACCESS

[Nanopore structure relevant to the D₂O permeation into silica thin films as studied by secondary ion mass spectrometry, ellipsometric porosimetry and positron annihilation](#)

S Yoshimoto, K Ito, H Hosomi, T Nakamura and M Takeda.....133

012028

OPEN ACCESS

[High-dose boron and silver ion implantation into PMMA probed by slow positrons: Effects of carbonization and formation of metal nanoparticles](#)

T Kavetskiy, K Iida, Y Nagashima, A Kuczumow, O Šauša, V Nuzhdin, V Valeev and A L Stepanov.....137

012029

OPEN ACCESS

[Positron annihilation in the near surface of room temperature ionic liquids](#)

T Hirade, B E O'Rourke and Y Kobayashi.....141

012030

OPEN ACCESS

[Modelling the line shape of very low energy peaks of positron beam induced secondary electrons measured using a time of flight spectrometer](#)

A J Fairchild, V A Chirayath, R W Gladen, M D Chrysler, A R Koymen and A H Weiss.....145

012031

OPEN ACCESS

[Time of flight spectra of electrons emitted from graphite after positron annihilation](#)

R W Gladen, V A Chirayath, M D Chrysler, A D McDonald, A J Fairchild, K Shastry, A R Koymen and A H Weiss.....150

012032

OPEN ACCESS

[Investigation of graphene using low energy positron annihilation induced Doppler broadening spectroscopy](#)

V A Chirayath, M D Chrysler, A D McDonald, R W Gladen, A J Fairchild, A R Koymen and A H Weiss.....154

012033

OPEN ACCESS

[Positron induced electron emission from graphene](#)

V A Chirayath, R W Gladen, K Shastry, M D Chrysler, A J Fairchild, A D McDonald, A R Koymen, B Barbiellini and A H Weiss.....160

012034

OPEN ACCESS

[Iterative fitting method for the evaluation and quantification of PAES spectra](#)

Samantha Zimnik, Mathias Hackenberg and Christoph Hugenschmidt.....167

012035

OPEN ACCESS

[Detection of re-emission positrons on metal surfaces during slow positron measurements](#)

A Kinomura, R Suzuki, H Ogawa, N Oshima, B E O'Rourke and A Yabuuchi.....172

012036

OPEN ACCESS

[Surface states and positron annihilation spectroscopy: results and prospects from a first-principles approach](#)

V Callewaert, R Saniz, B Barbiellini and B Partoens.....176

012037

OPEN ACCESS

[Spin-polarized first-principles calculation of momentum densities of Fe](#)

Itaru Sugita and Mineo Saito.....182

012038

OPEN ACCESS

[Development of a commercial positron annihilation lifetime measurement system](#)

M Yamawaki, K Ito, K Hattori and N Uesugi.....186