### E262 A. Shinohara Behavior of Pionic Hydrogen Atoms (II)

E360 A. Shinohara Study of Pion Mesonic Atoms (III)

## E546 A. Shinohara Measurement of Electronic X rays correlated with Pionic X rays

#### E567 A. Shinohara Precise Measurement of Electronic X rays from pionic atoms

E262

Submitted	1991.11.7
Approved	1991.12.3
Beam line	πμ
Shift requested	80
Shift executed	159
Executed cycles	92[2,3,6,7,9,10], 93[2,5,7,10]

## E360

1995.2.13, extension 1997.11.11	
1995.7.27, extension 1997.12.12	
πμ	
80 + 45 extension	
309	
(95[10,12], 96[2-2]), 96[5,7,8,9], 97[2-1,2-2], (97[4-1]), 97[4-3], 98[1,2]	

#### E546

Submitted	2003.3.14
Approved	2003.8.8
Beam line	πμ
Shift requested	35
Shift executed	30
Executed cycles	03[6-1]

## E567

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Received	2004.8.16		
Approved	2004.9.14		
Beam line	πμ		
Shift requested	30+15extension		
Shift executed	55		
Executed cycles	05[1,4-2]		

# Papers and activities

[Legend]

- Physics papers published in refereed journal
- Technical papers

• Physics papers published in refereed journal.

- Technical papers.
- $\star$  PhD theses.

 $\bigcirc$ 

- $\diamond$  Conference and Symposium.
- \* Internal Report and others.

★ PhD theses

- ♦ Conference and Symposium
- \* Internal Report and others
- A.shinohara et al. Measurements of transfer Process in Pion Capure by a Series of Alcohols Hyp. Int. 84, 569(1994) T. Saito et al. Mesasurements of Atomic Capture Probabilities of Negative Pions in Metal Hydrides Hyp. Int. 84, 193(1994) A.shinohara et al. Negative Pion Capture Process and its Chemical Effects in some Hydrocarbons Phys. Rev. A. 53, 130(1996) A.shinohara et al. Selective Measurements of Pion Transfer Process in Alcohols and Carboxylic Acids by Using the **Deuterated Compounds** Phys. Rev. Lett., 76, 2460 (1996) A.shinohara et al. Behavior of Pionic Hydrogen Atoms in Liquid Organic Compounds Hyp. Int., 106, 301(1997) • T. Muroyama, et al., Intensity Patterns of Pionic X-Ray Emitted from Some Organic Compounds Radiochim. Acta, 80, 31-36 (1998). • T. Muroyama, et al., Negative Pion Transfer Process in Hydrogen-Containing Gas Mixture J. Radioanal. Nucl. Chem. 239, 159-163 (1999). • A. Shinohara, et al. Behavior of Pionic Hydrogen Atoms in Gas and Liquid Phases J. Radioanal. Nucl. Chem. 239, 169-173 (1999). A. Shinohara Formation Process of Pionic Atoms and their Behavior in Material J. Nucl. Radiochem. Sci., 1(1) (2000) 33-37. • A. Shinohara, et al. Pion Transfer Process of Pionic Atoms in the Gas Mixtures Containing Hydrogen at Various Pressures Radiochim. Acta, 89 (2001) 849-852. • K. Ninomiya, et al. Energy Shift of Electronic X Rays Emitted from Pionic Atoms Radiochimca Acta. 93, 515-518(2005) K. Ninomiya, et al. Study of Electronic X rays Emitted from Pionic and Muonic Atoms Journal of Radioanalytical and Nuclear Chemistry 272(3) (2007) 661-664 ★ T. Muroyama Formation and Transfer Prodess of Pionic Hydrogen Atoms in Liquid Organic Compounds In Japanese, Nagoya Umiversity, 1997  $\diamond$  A. Shinohara Behavior of Pionic Hydrogen Atoms Int. Symposium on Roles of KEK-PS in Medium-energy Physics, Tsukuba (1994)  $\diamond$  T. Muroyama et al. Negative Pion Capture Process in Two Component Systems of Organic Compounds The 1995 Int. Chemical Congress of Pasific Basin Societies, Honolulu (1995)  $\diamond$  A. Shinohara et al. • Physics papers published in refereed journal.
- Technical papers.

<sup>★</sup> PhD theses.

 $<sup>\</sup>diamond$  Conference and Symposium.

<sup>\*</sup> Internal Report and others.

Behavior of Pionic Hydrogen Atoms in Gas and Liquid Organic Compounds 7 th Int. Conference on Muon spin Rotation/Relaxation/Resonance, Nikko (1996)  $\diamond$  A. Shinohara et al. Behavior of Pionic Hydrogen Atoms in Gas and Liquid Phases Asia-Pasific Symposium on Radiochemistry 1997, Kumamoto (1997)  $\diamond$  T. Muroyama et al. Negative Pion Transfer Process in Hydrogen-Containing Gas Mixtures Asia-Pasific Symposium on Radiochemistry 1997, Kumamoto (1997)  $\diamond$  A. Shinohara et al. Pion Transfer Processes of Pionic Atoms in the Gas and Liquid Phases 5<sup>th</sup> Int. Conference on Nuclear and Radiochemistry, Pontresina, Sep. 3-8, 2000.  $\diamond$  K. Goto. et al. Development of the Measuring System for Electronic X Rays Following Atomic Capture of **Negative Pions** Asia-Pacific Symposium on Radiochemistry 2001, Fukuoka, Oct. 30 – Nov. 1, 2001.  $\diamond$  K. Ninomiya et al. Energy Shift of Electronic X rays Emitted from Pionic Atoms 6th International Conference on Nuclear and Radiochemistry (NRC6), Poster, Aachen, Germany, 8/29-9/3 2004.  $\diamond$  K. Ninomiya et al. Electronic X-ray Energies Emitted from Pionic and Muonic Atoms The International 21st Century COE Symposium of BINDEC Chemistry Network (BINDEC 2005), The 6th International 21 Century COE Symposium on Integrated EcoChemistry(COEIEC 6), Poster, Osaka, Japan, 2005.10.11-13  $\diamond$  K. Ninomiya et al. Study of electronic X rays emitted from pionic and muonic atoms Asia-Pacific Symposium on Radiochemistry (APSORC-05), Poster, Beijing, China, 2005.10.17-21  $\diamond$  K. Ninomiya et al. Electronic KX-ray Energy Shift of Pionic and Muonic Atoms The 8th International 21st Century COE Symposium on Integrated EcoChemistry, Poster, Kyoto, 2006.8.28-2  $\diamond$  K. Ninomiya et al. Atomic Structure of Pionic and Muonic Atoms during Atomic Cascade The 9th International 21st Century COE Symposium on Integrated EcoChemistry, Oral, Hyogo, 2007.1.16-18 \* A. Shinohara, et al. Observation of the Pion Transfer Process in the H<sub>2</sub>+Ar and CH<sub>4</sub>+Ar Gas Mixtures at Various Pressures OULNS Ann. Rept. 1998, 128-130 (1999). \* A. Shinohara, et al. Pion Transfer from Hydrogen to Deuterium in H<sub>2</sub>+D<sub>2</sub> Gas Mixtures OULNS Ann. Rept. 1998, 131-132 (1999). \* K. Goto, et al. Test Experiments for Measurements of Electrons and X-Ray Emissions Following Pion Capture Process OULNS Ann. Rept. 2000, 138-139 (2001). \* K. Goto, et al. Test Experiments for Measurements of Electronic X Rays Following Pion Capture Process OULNS Ann. Rept. 2001, 126-127 (2002). \* K. Ninomiya, et al. Measurements of Electronic X Rays Correlated with Pionic X Rays OULNS Ann. Rept. 2002, 106-107 (2003). \* K. Ninomiya, et al.

<sup>•</sup> Physics papers published in refereed journal.

<sup>○</sup> Technical papers.
★ PhD theses.

Conference and Symposium.

<sup>\*</sup> Internal Report and others.

Electronic X-ray Measurement for Pionic Atoms in Metal and Their Oxide Targets OULNS Ann. Rept. 2003, 120-121 (2004). \* H. Sugiura, et al. Measurements of Electronic X Rays form Pionic Atoms in Various Elements OULNS Ann. Rept. 2003, 118-119 (2004) \* K. Ninomiya, et al. Shift of Electronic X-ray Energies Emitted from Pionic Atoms OULNS Ann. Rept. 2004, 111-112 (2005) \* H. Sugiura, et al Preliminary Experiments for Muonic Atom Chemistry OULNS Ann. Rept. 2004, 113-114 (2005) \* T. Nakatsuka, et al. Basic Study on the Chemical Property of Muonic Atoms OULNS Ann. Rept. 2005, 94-95 (2006) \* K. Ninomiya, et al. Comparison of Electronic X-ray Energies between Pionic and Muonic Atoms OULNS Ann. Rept. 2005, 96-97 (2006)

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