Conference on Laser and Accelerator Neutron Sources and Applications
LANSA'13

Tuesday, April 23

Oragnized by
• The Institute of Laser Engineering, Osaka University
Co-oragnized by
• The IFE Forum (IFE: Inertial Fusion Energy)
• The Laser Society of Japan
• The Atomic Energy Society of Japan
In cooperation with
• The Japan Society of Plasma Science and Nuclear Fusion Research

Hiroshi Azechi
Conference Chair,
Institute of Laser Engineering, Osaka Univ.

Tuesday, April 23

9:30-10:00
Opening Remarks of OPIC'13

Room 301,302

10:00-11:55
Keynote Lectures of OPIC'13

Room 301,302

----- Lunch Break （11:55-13:20） -----

13:20-15:20
Joint Plenary Sessions of OPIC'13

Room 301,302,303

----- Break （15:20-15:40） -----

15:40-15:45
Opening LANSA'13

Room 413

Opening Remarks
15:40 *H. Azechi, Institute of Laser Engineering, Osaka University, Osaka, Japan*

15:45-18:00
LANSA1 : LANSA Plenary

Room 413

Chair: *H. Nishimura, Institute of Laser Engineering, Osaka University, Osaka, Japan*

LANSA1-1 **(Plenary) Progress towards ignition on the US National Ignition Facility**
15:45 *M. Dunne*
National Ignition facility, Lawrence Livermore National Laboratory, California, U.S.A.

LANSA1-2 **(Plenary) RANS present status and future planning for industrial use and transportable compact neutron source**
16:30 *Y. Otake, A. Taketani, RIKEN, Wako, Japan*

LANSA1-3 **(Plenary) Basic experiments on accelerator driven subcritical system for transmutation of minor actinide and for innovative neutron source**
17:15 *M. Misawa, C. Pyeon, T. Yagi , Kyoto university, Kyoto, Japan*

-----Conference Reception (18:30-20:30)------

Wednesday, April 24

9:00-12:30
LANSA2: Neutron sources

Room 413

Chair: *M. Roth, Institut for Kernphysik Technische University, Darmstadt, Germany*

LANSA2-1 **(Invited) Low energy neutron measurements for ignition and capture cross section studies at the National Ignition Facility**
9:00 *L.A. Bernstein[1)], D.L. Bleuel[1)], J.A. Caggiano[1)] , C. Cerjan[1)], R. J. Fortner[1)], C. Hagmann[1)], R. Hatarik[1)], D. Sayre[1)], D.H.G.Schneider[1)] , W. Stoeffl[1)], D. Shaughnessy[1)] , K.J. Moody[1)] , J. Gostic[1)], P.M. Grant[1)] , C.B. Yeamans[1)], N.P. Zaitseva[1)], J.A. Brown[2)], N.M. Brickner[2)], B.H. Daub[2)], P.F. Davis[2)], B.L. Goldblum[1)], K.A. Van Bibber[2)] J. Vujic[2)], R.B. Firestone[3], A.M. Hurst[3)], A.M. Rogers[3)]*
[1)]Lawrence Livermore National Laboratory, California, U. S. A
[2)]University of California, Berkeley Dept. of Nuclear Engineering, U. S. A.
[3)]Lawrence Berkeley National Laboratory, U. S. A

LANSA2-2 **Fast ignition scheme fusion using high-repetition-rate laser**
9:45 *Y. Kitagawa[1)], Y. Mori[1)], O. Komeda[1)], R. Hanayama[1)], K. Ishii[1)], S.Nakayama[1)], T. Sekine[2)], N. Sato[2)], T.Kurita[2)], T. Kawashima[2)], H. Kan[2)], N. Nakamura[3)], T. Kondo[3)], M. Fujine[3)], H. Azuma[4)], T. Motohiro[4)], T. Hioki[4)], M. Kakeno[4)] , Y. Nishimura[5)], A. Sunahara[6)], Y. Sentoku[7)] , E. Miura[8], Y. Arikawa[9)], T. Nagai[9)], Y. Abe[9)],*
[1)]The Graduate School for the Creation of New Photonics Industries,
[2)]Development Bureau, Hamamatsu Photonics

K.K.
[3)]Advanced Material Engineering Div., TOYOTA Motor Corporation,
[4)]TOYOTA Central Research and Development Laboratories, Inc.,
[5)]Toyota Technical Development Corp.,
[6)]Institute for Laser Technology,
[7)]Department of Physics, University of Nevada,
[8)]National Institute of Advanced Industrial Science and Technology,
[9)]Institute of laser Engineering, Osaka University,

LANSA2-3 The advanced neutron diagnostics in the fast ignition experiment by using GEKKO XII and LFEX

10:15 *Y. Arikawa[1)], T. Nagai[1)], Y. Abe[1)], S. Kojima[1)], S. Sakata[1)], H. Inoue[1)], T. Murata[2)], N. Sarukura[1)], M. Nakai[1)], H. Shiraga[1)], H. Azechi[1)]*
[1)]Institute of Laser Engineering, Osaka University,
[2)]Kumamoto Univ. Japan

----- Break （10:45-11:00） -----

Chair: *L.A. Bernstein*, Lawrence Livermore National Laboratory, U. S. A.

LANSA2-4 (Invited) A bright neutron source driven by short pulse lasers

11:00 *M. Roth,*
Institut for Kernphysik Technische University Darmstadt, Germany,

LANSA2-5 High-Energy Neutron Source Generation Using the Omega EP Laser

11:45 *D.P. Higginson[1,2)], J.M. McNaney[2)], V. Yu Glebov[3)], G.M. Petrov[4)], B. Qiao[1)], C. Stoeckl[3)], D.C. Swift[2)], D.L. Bleuel[2)], J. Cobble[5)], J. Davis[4)], J.A. Frenje[6)], P.K. Patel[2)], G. Tynan[1)], and F.N. Beg[1)]*
[1)]University of California-San Diego, U. S. A.
[2)]Lawrence Livermore National Laboratory, U. S. A.
[3)]Laboratory for Laser Energetics, University of Rochester, Rochester, U. S. A
[4)]Naval Research Laboratory, Washington,
[5)]Los Alamos National Laboratory,
[6)]Massachusetts Institute of Technology,

----- Lunch Break （12:30-13:30） -----

13:30-15:00
LANSA3: Poster Session

Exhibition Hall D

LANSAp3-1 The development of the neutron detector for the fast ignition experiment by using LFEX and GEKKO XII facility
T. Nagai, M. Nakai, Y. Arikawa, Y. Abe, S. Kojima, S. Sakata, H. Inoue, S. Fujioka, H. Shiraga, N. Sarukura, T. Norimatsu, and H. Azechi,
Institute of Laser Engineering, Osaka University, Osaka, Japan

LANSAp3-2 Development of multichannel TOF neutron spectrometer for the fast ignition experiment
Y. Abe, H. Hosoda, Y. Arikawa, T. Nagai, S. Kojima, S. Sakata, H. Inoue, Y. Iwasa, K. Iwano, M. Nakai, T. Norimatsu, and H. Azechi
Institute of Laser Engineering, Osaka University, Osaka, Japan

LANSAp3-3 The neutron imaging diagnostics and unfolding technique for fast ignition experiment
H. Inoue[1)], Y.Arikawa[1)], S. Nozaki[2)], S. Fujioka[1)], T.Nagai[1)], S. Kojima[1)], Y. Abe[1)], S.Sakata[1)], M. Nakai[1)], H. Shiraga[1)], and H.Azechi[1)],
[1)]Institute of Laser Engineering, Osaka
[2)] Okinawa National College of Technology

LANSAp3-4 Generation of directed energetic neutron beams using short pulse lasers
G. M. Petrov[1)], D. P. Higginson[2)], J. Davis[1)], Tz. B. Petrova[1)], C. McGuffey[2)], B. Qiao[2)], and F. N. Beg[2)]
[1)]Naval Research Laboratory, Plasma Physics Division, U.S.A.
[2)]Mechanical and Aerospace Engineering, University of California-San Diego, U.S.A.

LANSAp3-5 Simplified neutron detector for angular distribution measurement of p-Li neutron source
M. Sakai, S. Tamaki, I. Murata
Graduate School of Engineering, Osaka University, Osaka, Japan

LANSAp3-6 Development of compton X-ray spectrometer for the fast ignition experiment
S. Kojima[1)], Y. Arikawa[1)], T. Nagai[1)], Y. Abe[1)], S. Sakata[1)], H. Inoue[1)], T. Namimoto[1)], M. Nakai[1)], H. Shiraga[1)], H. Azechi[1)], M. Asakawa[2)], T. Ozaki[3)], R. Kato[4)]
[1)]Institute of Laser Engineering, Osaka University, Osaka, Japan
[2)]Kansai University, Osaka, Japan
[3)]National Institute for Fusion Science, Japan
[4)]The Institute of Science and Industrial Research, Osaka University, Osaka, Japan

LANSAp3-7 Development of the high energy bremsstrahlung X-ray spectrometer by using (γ,n)reaction
S.Sakata[1)], Y.Arikawa[1)], S.Kojima[1)], Y.Abe[1)], T.Nagai[1)], H.Inoue[1)], R.Kato[2)], M.Nakai[1)], H.Siraga[1)], H.Azechi[1)]
[1)]Institute of Laser Engineering, Osaka University, Osaka, Japan
[2)]Institute of Science and Industrial Research, Osaka University, Osaka, Japan

LANSAp3-8 Study on nuclear transmutation of nuclear waste by 14MeV neutrons
T. Kitada, A. Umemura, K. Takahashi
Osaka University, Graduate School of Engineering, Division of Sustainable Energy and Environmental Engineering, Osaka, Japan

LANSAp3-9 Method of beam steering with FWM in ICF -Compensation of PC beam direction and generation with scattered beam from a foam target-
N. Kameyama, H. Yoshida,
Gifu University, Gifu, Japan

LANSAp3-10 Generation of monoenergetic deuterons by tailored intense laser pulses for high fluence energetic neutron production
S. M. Weng [1)], M. Murakami [1)], J. W. Wang [1,4)],

M. Chen [2], Z. M. Sheng [2], N. Tasoko [1], P. Mulser [3], W. Yu [4]
[1]Institute of Laser Engineering, Osaka University, Osaka, Japan
[2]Key Laboratory for Laser Plasmas and Department of Physics, Shanghai Jiaotong University, China
[3]Theoretical Quantum Electronics (TQE), Technische Universität Darmstadt, German,
[4]Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China

LANSAp3-11 The ESS-BILBAO Project

F. Sordo, The ESS-BILBAO Team
Edificio Cosimet Paseo Landabarri nº 2, 1ª Planta. Leioa, Spain

----- Break （15:00-15:15）-----

15:15-17:00
LANSA4: Applications

Room 413

Chair: M. Murakami, Institute of Laser Engineering, Osaka University

LANSA4-1 (Invited) Studies on accelerator-driven system in JAEA

15:15 *Toshinobu Sasa and Hiroyuki Oigawa*
J-PARC Center, Japan Atomic Energy Agency, Japan

LANSA4-2 Nuclear reaction analysis of the Li-ion battery electrodes by proton and neutron beams

16:00 *K.Mima[1], Raquel Gonzalez Arrabal[2], K.Fujita[1], Miguel Panizo Laiz[2] Y.Orikasa[3], Y.Uchimoto[3], A.Yamazaki[4], T.Kamiya[4], H.Sawada[5], C.Okuda[5], Y.Ukyo[5], S.Nakai[1], S.Sakabe[6], H.Nishimura[7], T.Saito[8], T.Yanagawa[9], H.Sakagami[9], J. Manuel Perlado[2] and Y.Kato[1]*
[1]The Graduate School for the Creation of New Photonics Industries
[2]Institute of Fusion Nuclear, UPM
[3]Graduate School of Human and Environmental Studies, Kyoto University
[4]Takasaki Advanced Radiation Research Institute, Japan Atomic Energy Agency
[5]Toyota Central R&D Labs.,
[6]Institute for Chemistry, Kyoto University
[7]Institute of Laser Engineering, Osaka University
[8]Battery Research Div., Toyota Motor
[9]National Institue of Fusion Science, Japan

LANSA4-3 Development of high-average-power short-pulse laser system for the isotope-specific nondestructive assay using laser-Compton γ-rays

16:15 *M. Mori, A. Kosuge, H. Okada, H. Kiriyama, Y. Ochi,, M. Tanaka, and K. Nagashima, Advanced laser development group, Quantum Beam Science Directorate, Japan Atomic Energy Agency, Kizu, Japan*

Thursday, April 25

9:00-12:15
LANSA5: Neutron sources

Room 413

Chair: I. Murata, Osaka University, Osaka, Japan,

LANSA5-1 (Invited) A planning effort for severe fusion neutron source generation in Korea and fusion-fission hybrid transmutation reactor R&D

9:00 *Jung-Hoon Han[1], G.S. Lee[2], Y.S. Hwang [1], B.G. Hong[3] , Yong-Su Na[1], Han-Gyu Joo[1], Hyung-Jin Shim[1], and K-DEMO team*
[1]CARFRE, Seoul National University, 599 Gwanak-ro, Gwanak-gu, Seoul, Korea, tel.
[2]National Fusion Research Institute, Korea,
[3]Jeon-Buk National University, Korea,

LANSA5-2 Transformation of the beam intensity distribution and formation of a uniform ion beam by means of nonlinear focusing

9:45 *Y. Yuri, T. Yuyama, T. Ishizaka, I. Ishibori, and S. Okumura,*
Takasaki Advanced Radiation Research Institute, Japan Atomic Energy Agency

LANSA5-3 Generation of high-quality proton beams with nanotube accelerator

10:15 *M. Murakami[1] M. Tanaka [2]*
[1]Institute of Laser Engineering, Osaka University, Osaka, Japan
[2]Department of Engineering, Chubu University, Japan

----- Break （10:15-10:30）-----

Chair: M. Nakai, Institute of Laser Engineering, Osaka University, Osaka, Japan,

LANSA5-4 (Invited) Compact accelerator driven neutron sources and their applications

10:30 *M. Furusaka and H. Sato*
Faculty of Engineering, Hokkaido University, Hokkaido, Japan

LANSA5-5 Development of X-band 30 MeV Linac neutron source at decommissioned experimental reactor "Yayoi" for Fukushima nuclear accident analysis

11:15 *M. Uesaka[1], K. Dobashi[1], T. Fujiwara[1], K. Tagi[1], H. Harda[2]*
[1]Nuclear Professional School, University of Tokyo, Tokyo, Japan
[2]Japan Atomic Energy Agency, Japan

----- Lunch Break （11:45-13:30）-----

13:30-15:45
LANSA 6: Neutron diagnostics

Room 413

Chair: D.P. Higginson, University of California-San Diego, U.S.A

LANSA6-1 (Invited) Low-energy neutron spectrometer for boron neutron capture therapy

13:30 *I. Murata and T. Obata,*
Division of Electrical, Electronic and Information Engineering, Graduate School of

Engineering, Osaka University, Osaka, Japan,

LANSA6-2 **A new neutron time-of-flight detector to measure the MeV neutron spectrum at the National Ignition Facility**

14:15 *R. Hatarik[1)], J. A. Caggiano[1)], V. Glebov[2)], J. McNaney[1)], C. Stoeckl[2)], and D. H. G. Schneider[1)]*
[1)]Lawrence Livermore National Laboratory, California, U. S. A.
[2)]Laboratory for Laser Energetics, University of Rochester, U. S. A.

LANSA6-3 **High-performance neutron imaging with microns scale resolution using LiF crystal detector**

14:45 *A. Faenov[1,2)], M. Matsubayashi[3)], T. Pikuz [1,2)], Y. Fukuda[1)], M. Kando[1)], R. Yasuda[3)], H. Iikura[3)], T. Nojima[3)], T. Sakai[3)], M. Shiozawa[4)], Y. Kato[5)]*
[1)]Quantum Beam Science Directorate, Japan Atomic Energy Agency, Japan
[2)]High Temperatures, Russian Academy of Sciences, Russia,
[3)]Quantum Beam Science Directorate, Japan Atomic Energy Agency, Kizu, Japan
[4)]Nippon SOKEN, Japan
[5)]The Graduate School for the Creation of New Photonics Industries, Hamamatsu, Japan

LANSA6-4 **Nuclear emulsion technique for fast neutron measurement using automatic track analysis system**

15:15 *H. Tomita[1)], H. Minato[1)], Y. Sakai[1)], K. Morishima[2)], K. Ishihara[1)], M Isobe[3)], J. Kawarabayashi[1)], T. Naka[2)], T. Asada[2)], T. Nakano[2)], M. Nakamura[2)], T Iguchi[1)], K. Ogawa[3)], K. Ochiai[4)]*
[1)]Graduate School of Engineering, Nagoya University
[2)]Graduate School of Science, Nagoya University,
[3)]National Institute for Fusion Science,
[4)]Fusion Research and Development Directorate, Japan Atomic Energy Agency

----- Break （15:45-16:00）-----

16:00-17:15

LANSA 7: Neutron sources

Room 413

Chair: K. Mima, *The Graduate School for the Creation of New Photonics Industries, Hamamatsu, Japan*

LANSA7-1 **Efficient and stable neutron generation by Coulomb explosion of solid nanoparticles using DPSSL-pumped high-repetition-rate 20-TW laser**

16:00 *N. Satoh, T Watari, K Matsukado, T Sekine, Y. Takeuchi, Y Hatano, R. Yoshimura, K. Nishihara, M. Takagi, and T. Kawashima, Hamamatsu Photonics, K. K*

LANSA7-2 **High yield neutron production via laser accelerated deuteron ion beam**

16:30 *F.Aymond, D. Kelley, J.T. Morrison, M. Storm, M. McMahon, K.U. Akli, E. Chowdhury, R.L. Daskalova, D. Schumacher, R. R. Freeman, The Ohio State University, SCARLET, Laser Facility, U. S. A.*

LANSA7-3 **Monte-Carlo simulations for neutron production of laser driven D(d,n) and ^{7}Li(d,xn) reactions using MCUNED**

17:00 *J. Alvarez[1)], P.Sauvan[2)], J. Perlado[1)], J. Sanz[2)]*
[1)] Instituto de Fusión Nuclear, Universidad Politécnica de Madrid, José Gutierrez Abascal, Madrid, Spain
[2)]Departamento de Ingeniería Energética, Universidad de Educación a Distancia, Madrid, Spain

17:30-17:40

Closing Remarks

17:30 *K. Mima, The Graduate School for the Creation of New Photonics Industries, Hamamatsu, Japan*