

11th International Topical Meeting on Nuclear Applications of Accelerators

(AccApp 2013)

**Bruges, Belgium
5 – 8 August 2013**

ISBN: 978-1-62993-828-8

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© (2013) by SCK-CEN
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact SCK-CEN
at the address below.

SCK-CEN
Belgian Nuclear Research Centre
Avenue Herrmann-debrouxlaan 40
1160 Brussels, Belgium

Phone: +32 2 661 19 51
Fax: +32 2 661 19 58

info@sckcen.be

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

MONDAY ORALS

ION ISSUES ON IRRADIATION BEHAVIOR OF STRUCTURAL MATERIALS AT HIGH DOSES AND GAS CONCENTRATIONS	1
<i>V. Bryk, O. Borodin, A. Kalchenko, V. Voyevodin, V. Ageev, A. Nikitina, V. Novikov, V. Inozemtsev, A. Zeman, F. Garner</i>	
ATOMIC STRUCTURE OF ION TRACKS AND MICROSTRUCTURE EVOLUTION IN OXIDES IRRADIATED WITH SWIFT HEAVY IONS	7
<i>K. Yasuda, T. Yamamoto, S. Takaki, S. Matsumura, N. Ishikawa</i>	
MODELING OF LOCAL CHANGES IN ALLOY COMPOSITION ALONG THE PROJECTED RANGE UNDER HIGH DOSE ION IRRADIATION	12
<i>V. Pechenkin, A. Chernova, F. Garner</i>	
HIGH POWER TARGET R&D PROGRAM AT FERMILAB	17
<i>P. Hurh, K. Ammigan, B. Hartsell, R. Tschirhart</i>	
RECENT PROGRESS OF HEAVY-ION CANCER RADIOTHERAPY WITH NIRS-HIMAC	22
<i>K. Noda, T. Furukawa, Y. Hara, T. Inaniwa, Y. Iwata, K. Katagiri, N. Kanematsu, A. Kitagawa, K. Mizushima, S. Mori, T. Murakami, M. Muramatsu, M. Nakao, S. Sato, T. Shirai, E. Takada, Y. Takei</i>	
LANSCE AS A HIGH-POWER BEAM APPLICATIONS TEST BED	27
<i>R. Garnett</i>	
THE STATUS OF KOMAC ACCELERATOR FACILITY	32
<i>Y. Cho</i>	
THE BARILOCHE LINAC – PRESENT ACTIVITIES	36
<i>R. Mayer, N. D'Amico, J. Granada, J. Dawidowski, J. Santisteban, J. Blostein, A. Tartaglione, L. Palomino, I. Marquez-Damian</i>	
DESIGN AND THERMAL-HYDRAULIC PERFORMANCE OF A HELIUM COOLED TARGET FOR THE PRODUCTION OF MEDICAL ISOTOPE ^{99m}Tc	41
<i>K. Woloshun, G. Dale, C. Kelsey IV, E. Olivas, M. Holloway, K. Hurtle, F. Romero, D. Dalmas, A. Naranjo</i>	
MEDICAL ISOTOPE PRODUCTION USING ACCELERATOR NEUTRONS	47
<i>Y. Nagai</i>	
⁶⁸Ge-⁶⁸Ga PRODUCTION: EXCITATION FUNCTIONS, TARGET PREPARATION AND PC-CONTROLLED RADIOCHEMISTRY SYSTEM	50
<i>R. Rebeles, A. Hermanne, P. Winkel, L. Vis, R. Waegeneer</i>	
A PHYSICAL DESIGN OF A NEUTRON IRRADIATION SPECTROMETER AT CSNS FACILITY	55
<i>Q. Yu, W. Yink, T. Liang</i>	
SAFETY CONSIDERATIONS FOR THE EUROPEAN SPALLATION SOURCE, ESS	60
<i>P. Jacobsson, F. Plewinski</i>	
AN OVERVIEW OF SAFETY CONTROL SYSTEM FOR ESS TARGET STATION	64
<i>A. Sadeghzadeh, F. Plewinski, A. Nordt</i>	
RF CONDITIONING OF HIGH POWER INPUT COUPLERS FOR XFEL SUPERCONDUCTING CAVITIES	69
<i>M. Khaldi, A. Gallas, W. Kaabi, P. Lepercq, C. Magueur, A. Thiebault, A. Verguet, A. Variola</i>	
INDUCED RADIOACTIVITY IN THE CERN LINAC4: A NEW 160 MEV PROTON LINAC	74
<i>F. Torre, M. Silari</i>	

MONDAY POSTERS

ACTIVATION AND WASTE MANAGEMENT ANALYSES FOR SNS	79
<i>I. Popova, F. Gallmeier, S. Trotter, M. Dayton, B. Patton</i>	
TRACE ELEMENTAL MAPPING OF CAMEL TEETH AND BONES FROM SUDAN USING NUCLEAR MICROPROBE TECHNIQUE	84
<i>M. Eisa, C. Pineda-Vargas, A. Bakhiet, A. Makkawi, Z. Mohammed, S. Naidoo</i>	
UPGRADE CONCEPT OF MULTIPURPOSE ITEP-TWAC	88
<i>N. Alexeev, P. Alekseev, V. Andreev, A. Balabaev, V. Balanutsa, A. Golubev, M. Kats, A. Kolomiets, V. Nikolaev, A. Ryabtsev, Y. Satov, V. Stolbunov, V. Schegolev, B. Sharkov, A. Shumshurov, V. Zavodov</i>	

NEUTRONIC DESIGN OF FAST NEUTRON IRRADIATION PORTS FOR THE EUROPEAN SPALLATION SOURCE	93
<i>A. Milocco, G. Gorini, G. Occhialini, L. Zanini, F. Mezei, S. Ansell</i>	
THERMAL ANALYSIS OF A 100KW COLLIMATOR IN PSI'S HIGH INTENSITY PROTON ACCELERATOR	98
<i>R. Sobbia, P. Baumann, D. Kiselev, D. Laube, A. Strinning</i>	
HELIUM MANAGEMENT OF THE ESS TARGET AND MONOLITH SYSTEMS	104
<i>P. Nilsson, R. Linander, A. Lundgren, C. Kharoua, P. Sabbagh, F. Plewinski, F. Mezei, E. Pitcher</i>	
ESS TARGET STATION HOT CELLS AND LOGISTICS	109
<i>M. Gohran, S. Gallimore, R. Linander, F. Mezei, E. Pitcher, M. Reungoat</i>	
PROJECT X TARGET STATION	114
<i>D. Wootan, D. Asner, M. Peterson, D. Senior</i>	
COOLING OF PULSE HEATED CANNED RODS	119
<i>P. Nilsson, P. Sabbagh, Y. Lee, P. Sievers</i>	
THERMO-HYDRAULIC DESIGN AND PERFORMANCE OPTIMIZATION OF THE ESS HELIUM COOLED ROTATING TUNGSTEN TARGET	124
<i>Y. Chen, X. Jin, S. Kecskes, B. Ghidersa</i>	

TUESDAY ORALS

HIGH DENSITY ELECTRON BEAM FOR GAMMA-RAY COMPTON SOURCES	129
<i>C. Vaccarezza, O. Adriani, S. Albergo, D. Alesini, M. Anania, A. Bacci, R. Bedogni, M. Bellaveglia, C. Biscari, R. Boni, I. Boscolo, M. Boscolo, F. Broggi, P. Cardarelli, M. Castellano, L. Catani, E. Chiadroni, A. Cianchi, A. Clozza, C. Curatolo, C. De Martinis, G. Di Domenico, E. DiPasquale, G. Dipirro, A. Drago, A. Esposito, M. Ferrario, A. Gallo, M. Gambaccini, G. Gatti, A. Ghigo, G. Graziani, F. Marcellini, C. Maroli, M. Marziani, G. Mazzitelli, E. Pace, G. Passaleva, L. Pellegrino, V. Petrillo, R. Pompili, R. Ricci, R. Rossi, M. Serio, L. Serafini, F. Sgamma, B. Spataro, A. Stecchi, A. Stella, P. Tomassini, A. Tricomi, M. Veltri, S. Vescovi, F. Villa, C. Ronsivalle, P. Antici, M. Coppola, E. Iarocci, L. Lancia, A. Mostacci, M. Migliorati, V. Nardone, L. Palumbo, I. Chaickovska, O. Dadoun, F. Druon, P. Fichot, P. Georges, A. Mueller, A. Stocchi, A. Variola, F. Zomer, D. Angal-Kalinin, N. Bliss, J. Clarke, B. Fell, A. Goulden, J. Herbert, S. Jamison, B. Martlew, P. Mcintosh, R. Smith, S. Smith</i>	
AN EXPERIENCE-BASED DESIGN APPROACH FOR HIGH-POWER LINACS	134
<i>R. Garnett</i>	
THE DORIAN CODE FOR THE PREDICTION AND ANALYSIS OF RESIDUAL DOSE RATES DUE TO ACCELERATOR RADIATION INDUCED ACTIVATION	139
<i>R. Froeschl</i>	
HIGH-POWER MAGNETRON RF SOURCE FOR SUPERCONDUCTING LINACS OF ADS AND INTENSITY-FRONTIER PROJECTS	144
<i>G. Kazakevich, R. Johnson, G. Flanagan, F. Marhauser, V. Yakovlev, B. Chase, S. Nagaitsev, R. Pasquinelli, D. Wolff</i>	
THE NATIONAL CENTER FOR ONCOLOGICAL HADRONTHERAPY IN ITALY (CNAO): DESIGN AND STATUS	149
<i>M. Pullia</i>	
RECENT PROGRESS OF PULSED SPALLATION NEUTRON SOURCE IN J-PARC	154
<i>H. Takada, K. Haga, S. Meigo, H. Tatsumoto, Y. Kasugai, M. Futakawa</i>	
JEMMRLA - A PROOF OF CONCEPT FOR OPTIMAL RECIRCULATING LINAC ACCELERATION FOR MUON COLLIDERS AND NEUTRINO FACTORIES	159
<i>Y. Roblin, A. Bogacz, V. Morozov</i>	
LINAC-BASED PHOTO-NUCLEAR APPLICATIONS AT THE IDAHO ACCELERATOR CENTER	163
<i>D. Dale, M. Mamtimin, T. Forest, O. Kosinov, V. Starovoitova, J. Stock, F. Harmon, P. Cole</i>	
PHOTOPRODUCTION OF MEDICAL RADIOISOTOPES WITH LINACS	168
<i>V. Starovoitova, D. Wells, P. Cole</i>	
LIFE SCIENCE APPLICATIONS OF LEAD-BISMUTH SPALLATION TARGET PLANNED IN J-PARC PROJECT	173
<i>T. Sasa, H. Oigawa, Y. Ikeda, N. Takahashi, K. Nakai, Y. Tahara</i>	
IMPORTANCE OF NUCLEAR DATA FOR NEUTRON RESONANCE DENSITOMETRY	178
<i>B. Becker, S. Kopecky, P. Schillebeeckx</i>	

NEUTRON STUDIES FOR ADVANCED REACTORS AT N_TOF (CERN)	183
<i>G. Tagliente, S. Altstadt, J. Andrzejewski, L. Audouin, M. Barbagallo, V. Bécaries, F. Becvár, F. Belloni, E. Berthoumieux, J. Billowes, V. Boccone, D. Bosnar, M. Brugger, M. Calviani, F. Calviño, D. Cano-Ottf, C. Carrapiço, F. Cerutti, E. Chiaveri, M. Chin, N. Colonna, G. Cortés, M.A. Cortés-Giraldo, M. Diakaki, C. Domingo-Pardo, I. Duran, N. Dzysiuk, C. Eleftheriadis, A. Ferrari, K. Fraval, S. Ganesan, A.R. García, G. Giubrone, M.B. Gómez-Hornillos, I.F. Gonçalves, E. González-Romero, E. Griesmayer, C. Guerrero, F. Gusing, P. Gurusamy, D.G. Jenkins, E. Jericha, Y. Kadi, F. Käppeler, D. Karadimos, P. Koehler, M. Kokkoris, M. Krτικά, J. Kroll, C. Langer, C. Lederer, H. Leeb, L.S. Leong, R. Losito, A. Manousos, J. Marganec, T. Martínez, C. Massimi, P.F. Mastinu, M. Mastromarco, E. Mendoza, A. Mengoni, P.M. Milazzo, F. Mingrone, M. Mirea, W. Mondalaers, C. Parada, A. Pavlik, J. Perkowski, A. Plompen, J. Praena, J.M. Quesada, T. Rauscher, R. Reifarh, A. Riego, F. Roman, C. Rubbia, R. Sarmiento, P. Schillebeeckx, S. Schmidt, J.L. Tain, D. Tarrío, L. Tassan-Got, A. Tsinganis, S. Valenta, G. Vannini, V. Variale, P. Vaz, A. Ventura, R. Versaci, M.J. Vermeulen, V. Vlachoudis, R. Vlastou, A. Wallner, T. Ware, M. Weigand, C. Weiss, T.J. Wright, P. Žugec</i>	
MODELING HIGH-POWER ACCELERATORS RELIABILITY - RELIABILITY MODEL OF SNS LINAC (SNS-ORNL); RELIABILITY MODELLING FOR MAX LINAC (MYRRHA PROJECT)	188
<i>A. Piñgói, P. Ramos</i>	
EXTENDED CAPABILITIES OF THE LIEGE INTRA NUCLEAR CASCADE MODEL	193
<i>A. Boudard, J. David, S. Leray, D. Mancusi, J. Cugnon</i>	
SIMULATING CONVOLUTED MODERATORS	201
<i>F. Gallmeier, E. Iverson, W. Lu, G. Muhrer, D. Baxter, E. Klinkby</i>	

TUESDAY POSTERS

RADIATION LEVELS AT CERN'S INJECTORS AND THEIR IMPACT ON ELECTRONIC EQUIPMENT	206
<i>J. Saraiva, M. Brugger</i>	
DEVELOPMENT OF BEAM FLATTENING SYSTEM USING NON-LINEAR BEAM OPTICS AT J-PARC	211
<i>S. Meigo, M. Ooi, A. Akutsu, K. Ikezaki, H. Fujimori</i>	
MEASUREMENT OF NEUTRON CONTAMINATION AROUND RADIOTHERAPEUTIC LINACS	216
<i>M. Kralik, J. Solc, J. Smoldasova</i>	
BENCHMARK CALCULATIONS OF NEUTRON PRODUCTION AND INDUCED RADIOACTIVITY FOR A PROTON AND A CARBON THERAPY ACCELERATOR	221
<i>Y. Hsu, R. Sheu</i>	
SS316L AS WINDOW FOR PRODUCTION TARGET FOR GE-68	226
<i>I. Silverman, D. Kijel, A. Arenshtam, I. Gavish, E. Lavie, E. Meroz, L. Weismann, A. Kreisel, I. Elyahu, E. Zemach, G. Shimel, S. Haroush</i>	
PIXE ANALYSIS OF THREE KINDS OF VEGETABLES FROM SUDAN USING LOW ENERGY VAN DE GRAAF ACCELERATOR	231
<i>M. Eisa, C. Pineda-Vargas</i>	
EXTENSION OF THE LIEGE INC MODEL TO SPALLATION REACTIONS AT A FEW GEV PROTON INCIDENT ENERGY	234
<i>J. Cugnon, A. Boudard, J. David, S. Leray, D. Mancusi</i>	
PERFORMANCES AND RELIABILITY NEEDS FOR THE CRYOGENIC SYSTEM OF THE MYRRHA SC LINAC	238
<i>T. Junquera, N. Chevalier, J. Thermeau, L. Romao</i>	

WEDNESDAY ORALS

THE ROTATING TUNGSTEN HELIUM COOLED TARGET (ROTHETA) CONCEPT	243
<i>C. Kharoua, P. Sabbagh, P. Nilsson, F. Mezei, F. Plewinski, P. Sievers, E. Pitcher, S. Kecskes, B. Ghidersa, Y. Chen</i>	
BI-SPECTRAL MODERATORS FOR EUROPEAN SPALLATION SOURCE	247
<i>A. Takibayev, K. Batkov, S. Gallimore, F. Mezei, L. Zanini</i>	
COLD MODERATORS FOR LONG PULSE NEUTRON SOURCES: UNPERTURBED BRIGHTNESS	251
<i>K. Batkov, A. Takibayev, L. Zanini, F. Mezei</i>	
OPERATION OF THE GENEPI-3C ACCELERATOR FOR THE ADS MOCKUP GUINEVERE	256
<i>E. Froidefond, M. Baylac, A. Billeband, P. Boge, D. Bondoux, J. Bouvier, T. Cabanel, S. Chabod, G. Dargaud, M. Heusch, A. Kochetkov, E. Labussiere, F. Lecolley, J. Leouey, G. Lehaut, N. Marie, J. Merttens, R. Micoud, F. Gestel, C. Grieken, B. Houdt, G. Vittiglio</i>	

THE POTENTIAL FOR A HIGH POWER FFAG PROTON DRIVER FOR ADS	261
<i>S. Sheehy, C. Johnstone, R. Barlow, A. Adelman</i>	
EXPERIMENTAL RESULTS ON THE DEUTERON-BEAM-INDUCED HIGH-ENERGY NEUTRON FISSION OF THE URANIUM ISOTOPES AT THE MASSIVE URANIUM TARGET	266
<i>L. Zavorka, J. Adam, W. Furman, M. Kadykov, J. Khushvaktov, A. Solnyshkin, V. Tsoupko-Sitnikov, S. Tyutyunnikov, J. Vrzalova, M. Suchopar, V. Chilap, P. Caloun</i>	
REACTIVITY MONITORING METHODS FOR THE KIPT NEUTRON SOURCE FACILITY	271
<i>Y. Cao, Y. Gohar, Z. Zhong</i>	
EXAMPLES OF CALCULATIONS OF SPALLATION TARGET RESIDUE PRODUCTION WITH INCL4.6-ABLA07 IMPLEMENTED INTO MCNPX	276
<i>A. Boudard, J. David, A. Leprince, S. Leray, D. Mancusi, D. Ene, L. Zanini, J. Cugnon</i>	
PHOTON ACTIVATION ANALYSIS ON LUNAR DUST SIMULANTS	280
<i>M. Mamtimin, P. Cole, C. Segebade</i>	
LOW ENERGY FUSION AS A NEUTRON SOURCE FOR SECURITY APPLICATIONS	285
<i>S. Albright, R. Seviour</i>	
HIGH POWER X-RAY PROCESSING FACILITY	290
<i>J. Bol</i>	

WEDNESDAY POSTERS

OPTICAL MODIFICATION OF ION BEAM IMPLANTED MATERIALS - OPTICAL WAVEGUIDES ANISOTROPY IN RUTILE	292
<i>J. Rickards, R. Trejo-Luna, E. Flores-Romero, J. Hernandez</i>	
ADVANCED SIC AND AL₂O₃ WITH UNIDIRECTIONAL OPEN POROSITY AS NEW PROTOTYPE TARGET MATERIALS FOR RADIOISOTOPE BEAM PRODUCTION	296
<i>M. Czapski, T. Stora, R. Augusto, C. Tardivat, S. Deville, J. Leloup, F. Bouville, R. Luis</i>	
CALIBRATION OF THE LARGE ACCEPTANCE NEUTRON DETECTOR ARRAY USING PHOTODISINTEGRATION OF THE DEUTERON	299
<i>J. Stock, D. Dale, O. Kosinov</i>	
EXCITATION FUNCTION OF THE ^{NAT}TA(P,X)^{178M2}HF REACTION	302
<i>Y. Titarenko, K. Pavlov, V. Rogov, A. Tiarenko, S. Yuldashev, V. Zhivun, A. Ignatyuk, S. Mashnik, S. Leray, A. Boudard, J. David, D. Mancusi, J. Cugnon, Y. Yariv, K. Nishihara, N. Matsuda, H. Kumawat, A. Yu</i>	
ACCELERATOR DRIVEN SYSTEM WITH CURRENT TECHNOLOGY	307
<i>T. Lee, H. Lee</i>	
STUDY ON THE STRUCTURAL INTEGRITY OF BEAM WINDOW FOR TEF TARGET	311
<i>H. Takei, H. Obayashi, H. Iwamoto, H. Kogawa, T. Sasa</i>	
RADIATION SAFETY ASPECTS OF TARGET SYSTEM FOR ACCELERATOR-BASED SUB-CRITICAL REACTOR	317
<i>H. Lee, T. Lee</i>	
PARAMETRIC STUDY OF SPALLATION TARGETS FOR THE MYRRHA REACTOR USING MCNPX SIMULATIONS AND NEURAL NETWORKS	321
<i>A. Rebello Jr., A. Martinez, A. Goncalves</i>	
POWER GAIN IN ADS WITH SUBCRITICAL REACTOR AND FISSION TARGET	326
<i>A. Golovkina, D. Ovsyannikov, I. Kudinovich, A. Bogdanov</i>	
SHIELDING DESIGN ANALYSIS OF KIPT NEUTRON SOURCE FACILITY	330
<i>Z. Zhong, Y. Gohar</i>	
COMPUTATIONAL CALCULATIONS FOR NEUTRON FLUX MULTIPLICATION BY A CASCADE MODEL	335
<i>K. Lee, K. Chung, B. Choi, S. Noh</i>	
PHYSICS DESIGN OF AN ELECTRON-BEAM DRIVEN NEUTRON GENERATOR	337
<i>S. Noh, B. Choi, K. Lee, K. Chung</i>	
A VERTICAL COMPACT ION IMPLANTER FOR NOVEL APPLICATIONS IN BIOTECHNOLOGY AND GEMMOLOGY	341
<i>S. Singkarat, A. Wijaikhum, D. Duwannakachorn, M. Rhodes, R. Suwankosum, S.L. Rattananin, S. Intarasiri, D. Bootkul, B. Phanchaisri, L. Yu</i>	

THURSDAY ORALS

THE IMPORTANCE OF ADS IN NUCLEAR FUEL CYCLE	346
<i>H. Xia, D. Liu, Q. Zhu, H. Li</i>	

TECHNOLOGY DEVELOPMENT FOR FUTURE SUPERCONDUCTING CW HADRON ACCELERATORS	352
<i>P. Ostroumov, V. Yakovlev</i>	
TARGET OPERATIONAL EXPERIENCE AT THE SPALLATION NEUTRON SOURCE	359
<i>B. Riemer, J. Janney, S. Kaminskas, D. McClintock, P. Rosenblad</i>	
PNS MEASUREMENT OF THE NEUTRON MULTIPLICATION FACTOR IN DEEPLY SUBCRITICAL STATES FOR ADS ON EXAMPLE OF YALINA-THERMAL ASSEMBLY	366
<i>S. Sadovich, A. Talamo, V. Bournos, H. Kiyavitskaya, Y. Fokov</i>	
OPTIMIZATION STUDIES FOR A MYRRHA-LIKE MOCK UP CONFIGURATION IN THE VENUS-F FACILITY	370
<i>L. Mercatali, X. Doligez, A. Kochetkov, G. Vittiglio, W. Uhyttenhove, G. Bianchini, M. Carta, V. Peluso, A. Gandini, V. Fabrizio</i>	
THE MYRRHA LINEAR ACCELERATOR R&D PROGRAM	375
<i>R. Salemme, L. Romao, D. Vandeplasseche</i>	
COMPARISON OF FLUKA PREDICTIONS TO MEASUREMENTS OF INDUCED ACTIVITIES OF SHIELDING AND ENVIRONMENTAL SAMPLES IRRADIATED WITH 2.5 GEV ELECTRONCS AT THE POHANG LIGHT SOURCE	379
<i>M. Leitner, J. Bauer, C. Chan, J. Liu, R. Qiu, S. Rokni, A. Sabourov, M. Kin, H. Lee</i>	
THE NEW IBA SUPERCONDUCTING SYNCHROCYCLOTRON (S2C2): FROM MODELING TO REALITY	384
<i>E. Pearson, M. Abs, S. Henrotin, W. Kleeven, J. Walle, P. Verbruggen, S. Zarembo</i>	
A NEW PROTON CT DETECTOR	389
<i>C. Coutrakon, G. Blazey, S. Boi, A. Dychkant, B. Erdelyi, A. Gearhart, D. Hedin, E. Johnson, V. Rykalin, S. Uzunyan, V. Zutshi, J. Krider, G. Sellberg, J. Rauch, M. Roman, P. Rubinov, P. Wilson</i>	
THE RADIATE COLLABORATION R&D PROGRAM: STATUS AND UPDATE	393
<i>K. Ammigan, P. Hurh, B. Hartsell, N. Mokhov, N. Simos</i>	
FIRST INVESTIGATIONS OF POSSIBILITIES FOR A THROUGH-GOING UCN TUBE AT THE ESS	398
<i>E. Klinkby, K. Batkov, L. Zanini</i>	
OPTIMIZATION OF COLD NEUTRON BEAM EXTRACTION AT ESS	403
<i>T. Schonfeldt, K. Batkov, E. Klinkby, B. Lauritzen, F. Mezei, E. Pitcher, A. Takibayev, P. Willendrup, L. Zanini</i>	
RELIABILITY AND RISK ANALYSIS OF THE EUROPEAN SPALLATION SOURCE, ESS	407
<i>A. Nordt, P. Jacobsson</i>	

LATER PAPER

OPTIMIZATION OF COLD NEUTRON BEAM EXTRACTION AT ESS	413
<i>T. Schonfeldt, K. Batkov, E. Klinkby, B. Lauritzen, F. Mezei, E. Pitcher, A. Takibayev, P. Willendrup, L. Zanini</i>	