Georg Schramm

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Personal Details

date of birth place of birth nationality

08 April 1987 Görlitz, Germany

/ German

Education

Jan 2015 **PhD in medical imaging**, TU Dresden, Germany

Thesis: "Evaluation and Improvement of MR-based attenuation correction in PET/MRI."

final mark: summa cum laude, link (German National Library)

Apr 2011 Master in (nuclear and particle) physics, TU Dresden, Germany

Thesis: "Simulation and analysis of neutron capture and photon scattering experiments."

Experiences

since Apr 2015 **Postdoctoral researcher**, KU Leuven, Belgium, Department of Imaging and Pathology, Division of Nuclear Medicine

As a PostDoc in the lab of Prof. Johan Nuyts, I am investigating joint advanced method for iterative PET image reconstruction and the application of deep learning in PET reconstruction

and image analysis. Moreover, I am heavily interested and involved in the translation of our research into clinical routine.

Jan 2015 - Mar 2015 Scientist, Helmholtz-Zentrum Dresden-Rossendorf (HZDR), Institute for Radiopharmaceutical Cancer Research

May 2011 - Jan 2015 **PhD student**, HZDR, Institute for Radiopharmaceutical Cancer Research

As a PhD student in the lab of Prof. Jörg van den Hoff, I was evaluating and improving whole-body MR-based attenuation correction using one of the first combined PET/MR systems

world-wide.

Member of the local organizing comittee for the 16th Virtual International Meeting on Fully
3D Image Reconstruction in Radiology and Nuclear Medicine

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As a member of the organizing comittee, I was responsible for organizing the virtual poster session on gather town as well as editing the conference proceedings submitted to arvix

since Apr 2019 Active member in the KU Leuven PostDoc Society

I am involved in organizing career and networking events for PostDocs and in the preparation of a PostDoc charta for KU Leuven.

Apr 2013 - Feb 2015 member of the management board of Werkstatt BigBand Dresden e.V.

In our student big band, I was organizing concerts, rehearsal weekends and finances.

Sep 2009 - Mar 2010 **Semester abroad**, University of Sheffield, UK

During my Erasmus semester in Sheffield, I was studying astronomy and applied mathematics

Aug 2008 - Jul 2009 Student research assistant, HZDR Institute of Radiation Physics

As an assistant, I was analysing neutron TOF and tranmission data and typesetting a lecture manuscript in latex.

Languages

German native English fluent Dutch basic

Teaching

since 2017 Techniques and technologies in Nuclear Medicine (assistant for Prof. J. Nuyts) since 2017 Medical Imaging (assistant for Prof. P. Suetens and Prof. F. Maes)

Awards

Nov 2019 **Best Poster Award 2nd place**

Synergistic Reconstruction Symposium, Chester

Mar 2015 **PhD Award**

Yearly award for the best PhD thesis at HZDR

Mar 2014 Award for notable achievements in nuclear medicine imaging

German Society of Nuclear Medicine

Mar 2014 Travel grant for RSNA 2014 for the best oral presentation of a young investigator.

Annual meeting of the German Society of Nuclear Medicine

May 2012 Award for the best oral presentation of a young investigator.

International conference on PET/MRI and SPECT/MRI. La Biodola, Italy

Jan 2012 Ehrenfried Walter von Tschirnhaus Urkunde

Yearly given to the five best graduates of the faculty of science at TU Dresden

Invited Talks

Nov 2019 State of the art of AI for medical image reconstruction and corrections

IEEE MIC 2019 workshop: Emergence and perspectives of artificial intelligence (AI) methods in real intelligence (AI) methods

in radiation-based imaging sciences, Manchester

Oct 2017 MR-based attenuation correction for the body

Annual congress of the European Association for Nuclear Medicine, Vienna

Sep 2017 Positron Emission Tomography - an introduction and overview about current developments

International workshop on positron studies on defects 2017, Dresden

Research Interests

PET PET image reconstruction

quantitative PET imaging PET image analysis

hybrid PET/MR imaging

Deep learning in medical image reconstruction and analysis

Reviewer for J Nucl Med, Eur J Nucl Med, IEEE TMI, Eur J Nucl Med Phys, Physica Medica

Associate Editor for Eur J Nucl Med Phys

Skills

programming Python, keras, tensorflow, pytorch, IDL, matlab, R, C, C++, bash, git, cmake, openmp, cuda, the

dicom standard, github link

mathematics numerics, inverse problems and convex optimization in medical imaging

clinical PET imaging more than 8 years of experience in clinical operation of a PET/MRI scanner

Leuven, July 28, 2022

Publication records

Google scholar profile link

ORCID ID link

First author peer-reviewed journal articles

G Schramm

Reconstruction-free Positron Emission Imaging Fact or Fiction? Frontiers in Nuclear Medicine (2022)

G Schramm, M Holler

Fast and memory-efficient reconstruction of sparse Poisson data in listmode with non-smooth priors with application to time-of-flight PET Physics in Medicine & Biology (2022)

G Schramm, D Rigie, T Vahle, A Rezaei, K Van Laere, T Shepherd, J Nuyts, F Boada Approximating anatomically-guided PET reconstruction in image space using a convolutional neural network Neuroimage 224:117399 (2021)

G Schramm, M Koole, S Willekens, A Rezaei, D Van Weehaeghe, G Delso, R Peeters, N Mertens, J Nuyts, K Van Laere Regional accuracy of ZTE-based attenuation correction in static [18F] FDG and dynamic [18F] PE2I brain PET/MR Frontiers in Physics 7:211 (2019)

G Schramm, C Ladefoged

Metal artifact correction strategies in MRI-based attenuation correction in PET/MRI BJR— Open 1:20190033 (2019)

G Schramm, M Holler, A Rezaei, K Vunckx, F Knoll, K Bredies, F Boada, J Nuyts Evaluation of parallel level sets and Bowsher's method as segmentation-free anatomical priors for time-of-flight PET reconstruction IEEE transactions on medical imaging 37:590–603 (2017)

G Schramm, J Maus, F Hofheinz, J Petr, A Lougovski, B Beuthien-Baumann, L Oehme, I Platzek, J van den Hoff Correction of quantification errors in pelvic and spinal lesions caused by ignoring higher photon attenuation of bone in [18F] NaF PET/MR Medical physics 42:6468–6476 (2015)

G Schramm, J Maus, F Hofheinz, J Petr, A Lougovski, B Beuthien-Baumann, I Platzek, J van den Hoff Evaluation and automatic correction of metal-implant-induced artifacts in MR-based attenuation correction in whole-body PET/MR imaging Physics in Medicine & Biology 59:2713 (2014)

G Schramm, J Langner, F Hofheinz, J Petr, B Beuthien-Baumann, I Platzek, J Steinbach, J Kotzerke, J van den Hoff Quantitative accuracy of attenuation correction in the Philips Ingenuity TF whole-body PET/MR system: a direct comparison with transmission-based attenuation correction

Magnetic Resonance Materials in Physics, Biology and Medicine 26:115-126 (2013)

G Schramm, J Langner, F Hofheinz, J Petr, A Lougovski, B Beuthien-Baumann, I Platzek, J van den Hoff Influence and compensation of truncation artifacts in MR-based attenuation correction in PET/MR IEEE transactions on medical imaging 32:2056–2063 (2013)

G Schramm, R Massarczyk, A Junghans, T Belgya, R Beyer, E Birgersson, E Grosse, M Kempe, Z Kis, K Kosev et al. Dipole strength in 78 Se below the neutron separation energy from a combined analysis of 77 Se (n, γ) and 78 Se (γ, γ') experiments Physical Review C 85:014311 (2012)

Last author peer-reviewed journal articles

A Reader, G Schramm

Artificial intelligence for PET image reconstruction

Journal of Nuclear Medicine 62:1330–1333 (2021)

Co-author peer-reviewed journal articles

J van Aalst, M Devrome, D Van Weehaeghe, A Rezaei, A Radwan, G Schramm, J Ceccarini, S Sunaert, M Koole, K Van Laere Regional glucose metabolic decreases with ageing are associated with microstructural white matter changes: a simultaneous PET/MR study European Journal of Nuclear Medicine and Molecular Imaging 49:664–680 (2022)

D Schaart, G Schramm, J Nuyts, S Surti

Time of flight in perspective: İnstrumental and computational aspects of time resolution in positron emission tomography IEEE transactions on radiation and plasma medical sciences 5:598–618 (2021)

S Meikle, V Sossi, E Roncali, S Cherry, R Banati, D Mankoff, T Jones, M James, J Sutcliffe, J Ouyang et al. *Quantitative PET in the 2020s: a roadmap* Physics in Medicine & Biology 66:06RM01 (2021)

G Degtiarova, P Claus, J Duchenne, G Schramm, J Nuyts, H Verberne, J Voigt, O Gheysens Impact of left bundle branch block on myocardial perfusion and metabolism: A positron emission tomography study Journal of Nuclear Cardiology 28:1730–1739 (2021)

D Van Weehaeghe, S Babu, J De Vocht, N Zurcher, S Chew, C Tseng, M Loggia, M Koole, A Rezaei, G Schramm et al. Moving towards multicenter therapeutic trials in ALS: feasibility of data pooling using different TSPO positron emission tomography (PET) radioligands.

Journal of Nuclear Medicine (2020)

J van Aalst, J Ceccarini, G Schramm, D Van Weehaeghe, A Rezaei, K Demyttenaere, S Sunaert, K Van Laere Long-term Ashtanga yoga practice decreases medial temporal and brainstem glucose metabolism in relation to years of experience EJNMMI research 10:1–8 (2020)

D Van Weehaeghe, M Devrome, G Schramm, J De Vocht, W Deckers, K Baete, P Van Damme, M Koole, K Van Laere Combined brain and spinal FDG PET allows differentiation between ALS and ALS mimics European Journal of Nuclear Medicine and Molecular Imaging 47:2681–2690 (2020)

X Tang, E Jafargholi Rangraz, W Coudyzer, J Bertels, D Robben, G Schramm, W Deckers, G Maleux, K Baete, C Verslype et al. Whole liver segmentation based on deep learning and manual adjustment for clinical use in SIRT European journal of nuclear medicine and molecular imaging 47:2742–2752 (2020)

J De Vocht, J Blommaert, M Devrome, A Radwan, D Van Weehaeghe, M De Schaepdryver, J Ceccarini, A Rezaei, G Schramm, J van Aalst et al. Use of multimodal imaging and clinical biomarkers in presymptomatic carriers of C9orf72 repeat expansion

JAMA neurology 77:1008–1017 (2020)

J De Vocht, A Chio, M Pagani, D Stam, H Van Esch, N Lamaire, M Verhaegen, N Mertens, K Poesen, L van den Berg et al.

A multi-modal biomarker study reveals early brain 18F FDG-PET changes at single subject level in presymptomatic C9orf72 repeat expansion carriers

Jama Neurology (2020)

R Boudewijns, H Thibaut, S Kaptein, R Li, V Vergote, L Seldeslachts, J Van Weyenbergh, C De Keyzer, L Bervoets, S Sharma et al. STAT2 signaling restricts viral dissemination but drives severe pneumonia in SARS-CoV-2 infected hamsters

Nature communications 11:1–10 (2020)

Y Tsai, G Schramm, S Ahn, A Bousse, S Arridge, J Nuyts, B Hutton, C Stearns, K Thielemans Benefits of using a spatially-variant penalty strength with anatomical priors in PET reconstruction IEEE Transactions on Medical Imaging 39:11–22 (2019)

A Rezaei, G Schramm, S Willekens, G Delso, K Van Laere, J Nuyts A quantitative evaluation of joint activity and attenuation reconstruction in TOF PET/MR brain imaging Journal of Nuclear Medicine 60:1649–1655 (2019)

A Rezaei, G Schramm, K Van Laere, J Nuyts

Estimation of crystal timing properties and efficiencies for the improvement of (joint) maximum-likelihood reconstructions in TOF-PET IEEE transactions on medical imaging 39:952–963 (2019)

F Hofheinz, J Maus, S Zschaeck, J Rogasch, G Schramm, L Oehme, I Apostolova, J Kotzerke, J den Hoff Interobserver variability of image-derived arterial blood SUV in whole-body FDG PET EJNMMI research 9:1–8 (2019)

G Degtiarova, P Claus, J Duchenne, M Cvijic, G Schramm, J Nuyts, J Voigt, O Gheysens Low septal to lateral wall 18 F-FDG ratio is highly associated with mechanical dyssynchrony in non-ischemic CRT candidates EJNMMI research 9:1–10 (2019)

I Platzek, B Beuthien-Baumann, G Schramm, J Maus, M Laniado, J Kotzerke, J van den Hoff, M Schuler FDG PET/MR in initial staging of sarcoma: Initial experience and comparison with conventional imaging Clinical Imaging 42:126–123 (2017)

R Wodtke, G Schramm, J Pietzsch, M Pietsch, R Löser Synthesis and Kinetic Characterisation of Water-Soluble Fluorogenic Acyl Donors for Transglutaminase 2 ChemBioChem 17:1263–1281 (2016)

J Petr, I Platzek, A Seidlitz, H Mutsaerts, F Hofheinz, G Schramm, J Maus, B Beuthien-Baumann, M Krause, J Van Den Hoff Early and late effects of radiochemotherapy on cerebral blood flow in glioblastoma patients measured with non-invasive perfusion MRI Radiotherapy and Oncology 118:24–28 (2016)

R Massarczyk, G Schramm, T Belgya, R Schwengner, R Beyer, D Bemmerer, Z Elekes, E Grosse, R Hannaske, A Junghans et al. Role of electric and magnetic dipole strength functions in the Cd 114 (γ, γ') and Cd 113 (n, γ) reactions Physical Review C 93:014301 (2016)

J Maus, G Schramm, F Hofheinz, L Oehme, A Lougovski, J Petr, I Platzek, B Beuthien-Baumann, J Steinbach, J Kotzerke et al. Evaluation of in vivo quantification accuracy of the Ingenuity-TF PET/MR Medical physics 42:5773–5781 (2015)

A Lougovski, F Hofheinz, J Maus, G Schramm, J Van den Hoff

On the relation between Kaiser–Bessel blob and tube of response based modelling of the system matrix in iterative PET image reconstruction Physics in Medicine & Biology 60:4209 (2015)

J van den Hoff, A Lougovski, G Schramm, J Maus, L Oehme, J Petr, B Beuthien-Baumann, J Kotzerke, F Hofheinz Correction of scan time dependence of standard uptake values in oncological PET EJNMMI research 4:1–14 (2014)

I Platzek, B Beuthien-Baumann, R Ordemann, J Maus, G Schramm, H Kitzler, M Laniado, J Kotzerke, J van den Hoff FDG PET/MR for the assessment of lymph node involvement in lymphoma: initial results and role of diffusion-weighted MR Academic Radiology 21:1314–1319 (2014)

J Petr, G Schramm, F Hofheinz, J Langner, J van den Hoff Modeling magnetization transfer effects of Q2TIPS bolus saturation in multi-TI pulsed arterial spin labeling Magnetic Resonance in Medicine 72:1007–1014 (2014)

J Maus, F Hofheinz, G Schramm, L Oehme, B Beuthien-Baumann, M Lukas, R Buchert, J Steinbach, J Kotzerke, J van den Hoff Evaluation of PET quantification accuracy in vivo Nuklearmedizin-NuclearMedicine 53:67–77 (2014)

R Massarczyk, R Schwengner, F Dönau, S Frauendorf, M Anders, D Bemmerer, R Beyer, C Bhatia, E Birgersson, M Butterling et al. *Nuclear deformation and neutron excess as competing effects for dipole strength in the pygmy region*Physical Review Letters 112:072501 (2014)

A Lougovski, F Hofheinz, J Maus, G Schramm, E Will, J Van den Hoff A volume of intersection approach for on-the-fly system matrix calculation in 3D PET image reconstruction Physics in Medicine & Biology 59:561 (2014)

I Apostolova, J Rogasch, R Buchert, H Wertzel, H Achenbach, J Schreiber, S Riedel, C Furth, A Lougovski, G Schramm et al. *Quantitative assessment of the asphericity of pretherapeutic FDG uptake as an independent predictor of outcome in NSCLC* BMC cancer 14:1–10 (2014)

J van den Hoff, L Oehme, G Schramm, J Maus, A Lougovski, J Petr, B Beuthien-Baumann, F Hofheinz
The PET-derived tumor-to-blood standard uptake ratio (SUR) is superior to tumor SUV as a surrogate parameter of the metabolic rate of FDG
EJNMMI research 3:1–8 (2013)

J Van den Hoff, F Hofheinz, L Oehme, G Schramm, J Langner, B Beuthien-Baumann, J Steinbach, J Kotzerke Dual time point based quantification of metabolic uptake rates in 18 F-FDG PET EJNMMI research 3:1–11 (2013)

I Platzek, B Beuthien-Baumann, J Langner, M Popp, G Schramm, R Ordemann, M Laniado, J Kotzerke, J van den Hoff PET/MR for therapy response evaluation in malignant lymphoma: initial experience Magnetic Resonance Materials in Physics, Biology and Medicine 26:49–55 (2013)

J Petr, G Schramm, F Hofheinz, J Langner, J van den Hoff Partial volume correction in arterial spin labeling using a Look-Locker sequence Magnetic resonance in medicine 70:1535–1543 (2013)

R Massarczyk, G Schramm, A Junghans, R Schwengner, M Anders, T Belgya, R Beyer, E Birgersson, A Ferrari, E Grosse et al. Electromagnetic dipole strength up to the neutron separation energy from 196 Pt (γ, γ') and 195 Pt (n, γ) reactions Physical Review C 87:044306 (2013)

R Hannaske, Z Elekes, R Beyer, A Junghans, D Bemmerer, E Birgersson, A Ferrari, E Grosse, M Kempe, T Kögler et al. Neutron total cross section measurements of gold and tantalum at the nELBE photoneutron source The European Physical Journal A 49:137 (2013)

R Massarczyk, R Schwengner, F Dönau, E Litvinova, G Rusev, R Beyer, R Hannaske, A Junghans, M Kempe, J Kelley et al. Electromagnetic dipole strength of 136 Ba below the neutron separation energy Physical Review C 86:014319 (2012)

B Beuthien-Baumann, I Platzek, I Lauterbach, J van den Hoff, G Schramm, K Zöphel, M Laniado, J Kotzerke Improved anatomic visualization of a glomus caroticum tumour within the carotic bifurcation with combined 68Ga-DOTATATE PET/MRI European journal of nuclear medicine and molecular imaging 39:1087–1088 (2012)

R Beyer, E Birgersson, A Junghans, R Massarczyk, G Schramm, R Schwengner, E Grosse *Electromagnetic strength in heavy nuclei*–experiments and a global fit International Journal of Modern Physics E 20:431–442 (2011)

Conference proceedings

A Rezaei, T Deller, K Wangerin, G Schramm, F Jansen, K Van Laere, J Nuyts Maximum Likelihood Estimation of the Geometric Sensitivities in PET IEEE Nuclear Science Symposium (NSS) and Medical Imaging Conference (MIC) (2019)

R Heylen, G Schramm, P Suetens, J Nuyts

4D CBCT reconstruction with TV regularization on a dynamic software phantom IEEE Nuclear Science Symposium / Medical Imaging Conference (NSS/MIC) (2019)

G Schramm, A Koole, F Boada, K van Laere, J Nuyts

An approach for a reconstruction-derived whole-blood arterial input function (RDIF) in PET/MRI

IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) / 25th International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (2018)

D Rigie, G Schramm, T Vahle, T Shepherd, J Nuyts, F Boada

Approximating MRI-Based Anatomically Guided PET Reconstruction with a Convolutional Neural Network

IÉÉE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) / 25th International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (2018)

A Rezaei, G Schramm, K Van Laere, J Nuyts

Estimation of crystal timings in TOF-PET

IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) / 25th International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (2018)

J De Ro, G Schramm, J Nuyts

Evaluation of region-of-interest-based brain PET reconstruction

IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) / 25th International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (2018)

Y Tsai, G Schramm, J Nuyts, S Ahn, C Stearns, A Bousse, S Arridge, K Thielemans

Spatially-variant Strength for Anatomical Priors in PET Reconstruction

IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) / 24th International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (2017)

A Rezaei, G Schramm, K Van Laere, J Nuyts

Data driven time alignment for TOF-PET

IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) / 24th International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (2017)

G Schramm, M Holler, T Koesters, F Boada, F Knoll, K Bredies, J Nuyts

PET Reconstruction with Non-smooth Gradient-based Priors

IEEE Nuclear Science Symposium / Medical Imaging Conference / Room-Temperature Semiconductor Detector Workshop (NSS/MIC/RTSD) (2016)

R Hannaske, D Bemmerer, R Beyer, E Birgersson, A Ferrari, E Grosse, A Junghans, M Kempe, T Koegler, K Kosev, M Marta, R Massarczyk, A Matic, K Schilling, G Schramm, R Schwengner, A Wagner, D Yakorev

Measurement of the photodissociation of the deuteron at energies relevant to Big Bang nucleosynthesis 6th Nuclear Physics in Astrophysics Conference (NPA) DOI link (2016)

R Massarczyk, R Schwengner, D Bemmerer, R Beyer, R Hannaske, A Junghans, M Kempe, T Koegler, G Schramm, A Wagner Investigation of dipole strength up to the neutron separation energy at gamma ELBE 15th International Symposium on Capture Gamma-Ray Spectroscopy and Related Topics (CGS) DOI link (2015)

T Belgya, R Massarzyk, L Szentmiklosi, G Schramm, R Schwengner, A Junghans, A Wagner, E Grosse Combined study of the gamma-ray strength function of Cd-114 with (n,gamma) and (gamma,gamma') reactions 15th International Symposium on Capture Gamma-Ray Spectroscopy and Related Topics (CGS) DOI link (2015)

R Schwengner, R Beyer, A Junghans, R Massarczyk, G Schramm, D Bemmerer, E Birgersson, A Ferrari, E Grosse, R Hannaske, M Kempe, T Koegler, A Matic, K Schilling, A Wagner, G Rusev, A Makinaga, T Belgya, Z Kis, L Szentmiklosi, J Weil, F Becvar, M Krticka EXPERIMENTS WITH NEUTRONS AND PHOTONS AT ELBE

14th International Symposium on Capture Gamma-Ray Spectroscopy and Related Topics (CGS) (2013)

R Massarczyk, G Schramm, E Birgersson, R Schwengner, E Grosse, A Junghans, A Wagner Investigation of dipole strength at the ELBE accelerator in Dresden-Rossendorf
3rd International Workshop on Compound Nuclear Reactions and Related Topics (CNR) DOI link (2012)

E Grosse, A Junghans, R Massarczyk, R Schwengner, G Schramm Description of dipole strength in heavy nuclei in conformity with their quadrupole degrees of freedom 3rd International Workshop on Compound Nuclear Reactions and Related Topics (CNR) DOI link (2012)

R Massarczyk, E Birgersson, G Schramm, R Schwengner, T Belgya, R Beyer, E Grosse, R Hannaske, A Junghans, A Matic, L Szentimiklosi, J Weil, A Wagner

Photon strength function deduced from photon scattering and neutron capture

EFNUDAT Users and Collaboration Workshop on Measurements and Models of Nuclear Reactions DOI link (2010)

E Grosse, A Junghans, F Becvar, E Birgersson, R Massarczyk, G Schramm Photon strength in spherical and deformed heavy nuclei

EFNUDAT Users and Collaboration Workshop on Measurements and Models of Nuclear Reactions DOI link (2010)

A Ferrari, R Beyer, E Birgersson, J Claussner, E Grosse, R Hannaske, A Junghans, M Kempe, T Koegler, R Massarczyk, A Matic, K Schilling, G Schramm, R Schwengner, A Wagner, F Weiss, D Yakorev

Optimization aspects of the new nELBE photo-neutron source

EFNUDAT Users and Collaboration Workshop on Measurements and Models of Nuclear Reactions DOI link (2010)