NanoScale 2008

Seminar on Quantitative Microscopy and

Nanoscale Calibration Standards and Methods

Istituto Nazionale di Ricerca Metrologica (iNRiM),

Strada delle Cacce, 91

10135 Torino, Italy

22 & 23 Sept. 2008

Organized by:

EURAMET
European Association of National Metrology Institutes

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Competence Centre Ultraprecise Surface Figuring

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PTB

Monday September 22nd

Time	Titel
08:00	**Registration**

09:00 **Welcome**

G.B. Picotto, INRIM, Italy & L. Koenders, Physikalisch-Technische Bundesanstalt Braunschweig, Germany

Session SPM & CMM

09:10 **Design and realization of a long stroke translation stage for SPM**

C. Werner

TU Eindhoven, Netherlands

09:30 **A high precision micro/nano CMM using two kinds of tactile probes**

G. Dai, F. Pohlenz, S. Bütefisch, H.-U. Danzebrink

Physikalisch-Technische Bundesanstalt Braunschweig, Germany

09:50 **Progress on the NMi-VSL metrological SPM**

K.R. Koops, M.G.A. van Veghel

NMi van Swinden Laboratorium, Delft, Netherlands

10:10 **Coffee and Poster session**

Session Standards

10:50 **Systematic analysis of non-linear deviations by established standards and a new generation of 3D pyramidal standards.**

T. Dziomba (1), M. Ritter (2), K.D. Katzer (1), M. Xu (1), G. Dai (1), L. Koenders (1)

1) Physikalisch-Technische Bundesanstalt Braunschweig, Germany; 2) Federal Institute for Materials Research and Testing (BAM), Berlin, Germany

11:10 **The role of 2D gratings for accurate dissemination of the nanometre**

J. Garnaes (1), F. Meli (2), E. Buhr (3), H.-U. Danzebrink (3), L. Koenders (3), J. Haycocks (4), K.H. Jackson (4), A. Yacoot (4), M. Pisani (5), P. Klapeteck (6), R. Dixson (7), T. Vorburger (7), I.Misumi (8), T. Kurosawa (8), G.S. Peng (9), J.-A. Kim (10), V. Korpelainen (11), A. Lassila (11), S. Gao (12)

1) DFM - Danish Fundamental Metrology, Lyngby, Denmark; 2) Metas, Bern-Wabern, Switzerland; 3) Physikalisch-Technische Bundesanstalt Braunschweig, Germany; 4) NPL, Teddington, UK; 5) INRIM, Italy; 6) CMI, Czech Republik; 7) NIST, USA; 8) NMIJ/Aist, Japan; 9) CMS/ITRI, Taiwan; 10) KRISS, Korea; (11) Mikes, Finland; 12) NIM, China;

11:30 **Evaluation of Uncertainty in Grating Pitch Measurement by Optical Diffraction using Monte Carlo Methods (GUM Supplement One)**

J. E. Decker, B. J. Eves, J. R. Pekelsky and R. J. Douglas, NRC Institute for National Measurement Standards (INMS), National Research Council Canada (NRC)

11:50 **Poster session**

12:30 - 13:00 **Lunch**

13:20 **Poster session**

Session AFM Probes

14:20 **Characterizing AFM probe tip using comb-shaped grating**

H. Itoh (1), C. Wang (2), T.-W. Chiu (1), S. Ichimura (1)
1) National Institute of Advanced Industrial Science and Technology, Japan;
2) School of Life Science and Biotechnology, Shanghai JiaoTong University

14:40 **Tip-sample relaxation as a source of uncertainty in nanoscale scanning probe microscopy measurements**

A. Campbellová, P. Klapetek and M. Valtr
Department of Nanometrology, Czech Metrology Institute, Brno, Czech Rep.

15:00 **Verifying the reconstruction of AFM tips with SEM**

K. Dirscherl
Danish Fundamental Metrology, Lyngby, Denmark

15:20 **3D TEM nano-metrology**

F. Marinello (1,2), A. Horsewell (3,4), L.C. Gontard (4), L. Carli (3), S. Carmignato, E. Savio E.(1), R.E. Dunin-Borkowski (4)
1) Dipartimento di Innovazione Meccanica e Gestionale, University of Padova, Italy; 2) CIVEN, Coordinamento Interuniversitario Veneto per le Nanotecnologie, Italy; 3) DTU Mechanical Engineering, Denmark; 4) DTU Center for Electron Nanoscopy, Denmark; 5) Dipartimento di Tecnica e Gestione dei Sistemi Industriali, University of Padova, Italy

15:40 **Coffee and Poster session**

Session Interferometry

16:30 **Optical interferometry with 10 pm level accuracy - the Project Nanotrace**

M. Matus, A. Niessner (1), P. Balling, P. Kren, P. Klapetek (2), A. Lassila (3), A. Yacoot (4), G. B. Picotto, M. Pisani (5), J. Flügge, U. Kuetgens (6), M. Celik, R. Hamid (7)
1) BEV, Austria; 2) CMI, Czech Republik; 3) Mikes, Finland; 4) NPL, England; 5) INRIM, Italy; 6) Physikalisch-Technische Bundesanstalt Braunschweig, Germany; 7) UME, Turkey

16:50 **Interferometric calibration of nanometric displacement actuators**

M. Matus (1), E. Prieto (2), P. Balling (3), O. Kruger (4), J. Hald (5), G.B . Picotto (6), S. Ducourtieux (7), F. Meli (8), A. Lassila (9), H. Piree (10), R. Fira (11), R. Johansson (12), T. Yandayan (13)
1) BEV, Austria; 2) CEM, Spain, 3) CMI, Czech Republic; 4) NMISA, South Africa; 5) DFM, Denmark; 6) INRIM, Italy; 7) LNE, France; 8) METAS, Switzerland; 9) MIKES, Finland; 10) SMD, Belgium; 11) SMU, Slovakia; 12) SP, Sweden; 13) UME, Turkey

17:10 **End of first day**

19:00 **Meeting Downtown Centre**

20:00 **Conference Dinner at Downtown Centre**
Ceremony for the Nanoknight 2008

Tuesday September 23rd

Time **Titel**

Invited Talk

08:30 **Atomic force microscopy: a versatile tool in biophysics**

A. Alessandrini

University of Modena, Italy

Session Small Structures

09:10 **Characterization of nanoparticles by scanning electron microscopy in transmission mode**

E. Buhr (1), N. Senftleben (2), D. Bergmann (1), D. Gnieser (1) , C.G. Frase (1), H. Bosse (1)

1) Physikalisch-Technische Bundesanstalt Braunschweig, Germany; 2) TU Dresden, Institut für Verfahrens- und Umwelttechnik, Dresden, Germany

09:30 **Optical Diffraction Images of Nanowires and the Implications for Diameter Estimation**

M.Muraoka

Department of Mechanical Engineering, Akita University, Japan

09:50 **Two-dimensional atom encoder using a lateral-dithered STM tip and a regular crystalline lattice (Toward direct-measurement of radial error motion of ultra-precise spindle)**

C. Patamaporn (1), M. Aketagawa (1) and E. Okuyama (2)

1) Department of Mechanical Engineering, Nagaoka University of Technology, JAPAN; 2) Department of Faculty of Resource Science and Engineering, Akita University, Akita, JAPAN

10:10 **Coffee break - Poster session**

Session Medium Structures

10:50 **Design and Frabrication of a 1D Grating Pitch Standard by Nanoimprint Lithography for Traceable Calibration of Scanning Microscopes for Nanotechnology**

J.R. Pekelsky, B.J. Eves and J. E. Decker (1), A.L. Bogdanov, D.Goodchild, S. Wingar, F. Shepherd (2)
1) NRC Institute for National Measurement Standards (INMS), Canada; 2) Canadian Photonics Fabrication Centre, NRC Institute for Microstructural Sciences (IMS)

11:10 **Metrology study of microsystem components: application to microstructure made by the deep x-ray lithography process (LIGA)**

P. Meyer, O. Mäder, J. Schulz, V. Saile

Institut für Mikrostrukturtechnik Karlsruhe, Institute of Technology, Eggenstein, Germany

11:30 **Development of a multifunctional microelectromechanical nano-force actuator for calibration of the normal and lateral spring constant of an AFM cantilever**

Z. Li, S.Gao, K. Herrmann

Physikalisch-Technische Bundesanstalt Braunschweig, Germany

11:50 **Poster session**

12:30 - 13:00 **Lunch & Coffee**

Session Forces, Scanners, Optics

13:20 **Local probe microscopy with interferometric monitoring of the stage nanopositioning**

J. Lazar (a), P.Klapetek (b), O.Cipa, M. Cizeka and M. Serya (a)

a) Institute of Scientific Instruments, Academy of Sciences of the Czech Republic, Brno, Czech; b) Czech Metrology Institiute, Brno, Czech Republic

13:40 **Development of a new high guidance quality XYZ flexure scanner for the LNE metrological AFM**

B. Poyet (1), S. Ducourtieux (1), J. David (2), L. Lahousse (1), S. Leleu (2),

1) LNE, Laboratoire National de Métrologie et d'Essais, France; 2) L2MA, Ecole Nationale Supérieure des Arts et Métiers, France

14:00 **Focusing an optical microscope for length metrology applications**

R. Köning, J. Flügge, H. Bosse, C. Weichert, B. Bodermann, G. Ehret

Physikalisch-Technische Bundesanstalt Braunschweig, Germany

14:20 **Closing**

14:30 **Coffee**

15:00 **Lab-Visits**

Poster Session - Instrumentation and Methods

Poster No.	Titel
1	**Lock-in harmonic detection and fast correction of the periodical phase error in heterodyne interferometry** G. B. Picotto Istituto Nazionale di Ricerca Metrologica, INRIM, Italy
2	**Design of a large measurement-volume metrological AFM** B. J. Eves National Research Council Canada, Ottawa, Canada
3	**Modelling of the Tip Wear for Scanning Probe Microscopes** M. Xu, T. Dziomba, L. Koenders Physikalisch-Technische Bundesanstalt Braunschweig, Germany
4	**Large scale modeling of nanoscale forces** P. Klapetek (1), A. Campbellová (1), V. Buršíková (2) and M. Valtr (1) 1) Department of Nanometrology, Czech Metrology Institute, Brno, Czech Republic; 2) Faculty of Science, Masaryk University, Brno, Czech Republic
5	**A new high aperture 193 nm microscope for traceable dimensional characterization of micro- and nanostructures** G.Ehret, F. Pilarski, D. Bergmann, B. Bodermann, E. Buhr Physikalisch-Technische Bundesanstalt Braunschweig, Germany
6	**Development of SWNT Tip as 1 nm Resolution AFM Probe** D.-H. Kim (1), K.-J. Kim (1), S.Y.Jung (1), K. Kwon (1), J. J.An (2), H.S. Lee (2) 1) Korea Research Institute of Standards and Science, Daejeon, Korea; 2) Department of Nano & Advanced Materials Engineering, Jeonju University, Jeonju, Korea
7	**Design of a new 3D-metrology AFM at METAS using differential Jamin type interferometers** F. Meli Metas, Bern-Wabern, Switzerland
8	**Development of the LNE metrological AFM** B. Poyet, S. Ducourtieux, l. Lahousse (1), J.David, S. Leleu (2) 1) LNE, Laboratoire National de Metrologie et d´Essais, France; 2) L2MA, Ecole Nationale Superieure des Arts et Metiers, France
9	**Advanced three dimensional Scan Methods of the Nanopositioning and Nanomeasuring Machine** T. Hausotte, B. Percle, G. Jäger Technische Universität Ilmenau, Institute of Process Measurement and Sensor Technology, Ilmenau, Germany
10	**A nanoforce facility and a novel method for measurement of permittivity of an air (vacuum) at zero frequencies** V. Nesterov Physikalisch-Technische Bundesanstalt Braunscheig, Germany
11	**A multi-electrodes plane capacitive sensor for displacement measurements and attitude controls** G.B. Picotto, M. Pisani, A. Sosso Istituto Nazionale di Ricerca Metrologica, INRIM, Italy
12	**Interferometer with optical path multiplication for picometer resolution** M. Pisani Istituto Nazionale di Ricerca Metrologica, INRIM, Italy
13	**A microelectromechanical testing platform for determination of the electrical/mechanical properties of nanowires** S. Gao, Z. Li, K. Herrmann Physikalisch-Technische Bundesanstalt Braunschweig, Germany

Poster Session - Instrumentation and Methods

Poster No.	Titel
14	**Measurement of air-refractive-index fluctuation from frequency change using phase modulation homodyne interferometer and external cavity laser diode. (Toward construction of constant "air-refractive-index" chamber)** M. Aketagawa, T.B. Quoc, Y. Hoshino, M. Ishige Department of Mechanical Engineering, Nagaoka University of Technology, Kamitomioka, Nagaoka, Niigata, Japan
15	**Deconvolution of Kelvin Probe Force Microscopy measurements - methodology and application** T. Machleidt, E. Sparrer, K.-H. Franke, D. Kapusi TU Ilmenau, Germany
16	**Laser Displacement Interferometers with Subnanometre Resolution in Absolute Ballistic Gravimeters** L. Vitushkin (1), O. Orlov (2), A. Ermak, G. D. Agostino (3) 1) Bureau International des Poids et Mesures, Pavillon de Breteuil, Sèvres Cedex, France; 2) D.I. Mendeleyev
17	**A 3 D micro tactile sensor for dimensional metrology of micro structure** L. Yuan (1+2), F. Yunxia (1), S. Weibun (1), Q. Chaoqing (1), L. Dachao (2) 1) Shanghai Institute of Meas. and Testing Technol., Shanghai, China; 2) State Key Lab. of Precision Measuring Technol. and Instruments, Tianjin Uni., Tianjin, China
18	**Common path tow wavelength homodyne counting interferometer development** P. Kren, P. Balling Czech Metrology Instituite, Prag, Czech Republic
19	**The wavelength of 57Fe Moessbauer radiation: towards a future nanometer length standard** A. Birk, P. Becker, U. Kuetgens (1), Y. Shvyd'ko (2) 1) Physikalisch-Technische Bundesanstalt Braunschweig, Germany; 2) Advanced Photon Source, Argonne Nat. Lab.
20	**Atomic force acoustic microscopy for quantitative nanomechanical characterization** F. Marinello (1,2), P. Schiavuta (1), E. Savio (2) 1) CIVEN, Coordinamento Interuniversitario Veneto per le Nanotecnologie, Italy; 2) Dipartimento di Innovazione Meccanica e Gestionale, University of Padova, Italy
21	**Digital control of beams position in high-resolution interferometer for calibration of precise length sensors** O. Cíp, R. Smíd, Z.Buchta, M.Cízek and J. Lazar Institute of Scientific Instruments, Academy of Sciences of the Czech Republic, Brno, Czech Republic
22	**Near-field optical microscopy and luminescence localisation measurements** P. Klapetek (1), P. Klenovský (1,2), M. Valtr (1) and J. Bujdák (3) 1) Department of Nanometrology, Czech Metrology Institute, Brno, Czech Republic; 2) Department of Condensed Matter Physics, Faculty of Science, Masaryk University, Brno, Czech Republic;
23	**Precise interferometric length measurement using real-time fringe fitting** Bogdan Ionita, Petre Catalin Logofatu, Dan Apostol National Institute for Laser Plasma and Radiation Physics, Magurele, Romania

Poster Session - Calibration

Poster No.	Titel
24	**A Virtual Scanning Probe Microscope** M.G.A. van Veghel, K.R. Koops NMi van Swinden Laboratorium, Netherlands
25	**Nano-Stage Calibration Uing a Homodyne Laser Interferometer** S.H. Wang, G. Xu, S.L. Tan National Metrology Centre, Agency for Science, Technology an Research (A*STAR), Singapore, Republic of Singapore
26	**Nanolayer characterization by X-ray and EUV reflectometry** M.Krumrey, F. Scholze Physikalisch-Technische Bundesanstalt-Berlin, Germany

Poster Session - Calibration

Poster No. **Titel**

27 **Reconstruction of the feature's shape and dimension by data processing of sequenced various angle AFM scans**

Andrzej Sikora (1), Paweł Janus (2)

(1) Electrotechnical Institute, ul. M. Sklodowskiej-Curie 55/61, 50-369 Wroclaw, Poland,

(2) Institute of Electron Technology, Al. Lotnikow 32/46, 02-68 Warsaw, Poland

28 **Test object of the linewidth with a trapezoidal profile and three certified sizes for a SEM and AFM**

V.P. Gavrilenko (1), V.B. Mityukhlyaev (1), Yu.A. Novikov (2), Yu.V. Ozerin (3),

A.V. Rakov (2), P.A. Todua (1)

1) Center for Surface and Vacuum Research, Moscow, Russia; 2) A.M.Prokhorov General Physics Institute of the Russian Academy of Scienses, Moscow, Russia; 3) Mikron Corp., Moscow, Russia

29 **Accuracy estimation of SPM 3D-calibration by error separation**

M. Ritter (1), A. Friedrich (2), T. Dziomba, L. Koenders (3), A. Kranzmann (1)

1) Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany; 2) Technische Universtität Berlin, Germany; 3) Physikalisch-Technische Bundesanstalt Braunschweig, Germany

30 **Improving edge detection using a focus sensor by simulation with rigorous diffraction theroy**

H. Baitinger, E. Manske, S.Sinzinger, G.Jäger

Technische Universität Ilmenau, Institute of Process Measurement and Sensor Technology, Ilmenau, Germany

31 **Set of TiO2 thin films as a reference standard for thickness measurements at the nanoscale**

P. Colombi, M. Zucca, E. Bontempi, L. E. Depero

INSTM and Laboratorio di Chimica per le Tecnologie, Università di Brescia, Brescia, Italy

32 **Self-assembled silica nano-spheres for AFM-tip curvature radius evaluation**

P. Colombi, I. Alessandri, P. Bergese, L. E. Depero

INSTM and Laboratorio di Chimica per le Tecnologie, Università di Brescia, Brescia, Italy

33 **Testing of X-ray Microtomography Systems using a Traceable Geometrical Standard**

S. Carmignato (1), D.Dreossi (2), L. Mancini (2), F. Marinello (3,4), G. Tromba (2), E. Savio (3)

1) DTG, University of Padova, Vicenza, Italy; 2) Sincrotrone, Trieste S.C.p.A., Trieste, Italy; 3) DIMEG, University of Padova, Padova, Italy; 4) CIVEN, Centro Interuniversitario Veneto per le Nanotecnologie, Venezia, Italy

34 **Nanoroughness : towards the realization of standards with a continuum of spatial freqencies**

N. Fourati (1), Z. Silvestri (2), H. Nasrallah (3), M. Zerrad (4), C. Zerrouki (1), F. DeFornell (3), C. Deumié (4), C. Amra (4), S. Ducourtieux (5), P. Pinot (2), S. Monnoy (6)
1) Laboratoire de Physique LP-Cnam, Paris, France, 2) Institut National de Metrologie LNE-INM/Cnam, Paris, France, 3) Institut Carnot de Bourgogne; ICB-OCP, Dijon, France 4) Institut Fresnel IF, Marseille, France, 5) Laboratoire National de Metrologie et dËssai LNE Paris, France, 6) Novasic, Le Bourget du Lac

35 **Development of roughness measurement standard with irregular surface topography for improving 3D surface texture measurement**

K. Nemoto (1), K.Yanagi (1), M. Aketagawa (1), I. Yoshida (2), M. Uchidate (3), T. Miyaguchi, H. Mauyama (4)

1) Department of Mechanical Engineering; 2) Nagaoka, Innovation Satellite Niigata, Japan Science and Technology Agency, Japan; 3) Department of Mechanical Engineering Iwate University, 4) Laser Application Research Lab., Industrial Research Inst. Of Niigata Prefecture, Japan

36 **Test objects with right-angled and trapezoidal profiles of the relief elements**

V.P. Gavrilenko (1), Yu.A. Novikov (2), A.V. Rakov (2), P.A. Todua (1)

1) A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; 2) Center for Surface and Vaccuum Research, Moscow, Russia

37 **A new type of standard for scanning force microscopy**

M. Senoner, M. Sahre and W. Unger

Bundesanstalt für Materialforschung und –prüfung, Berlin, Germany

38 **Influence of drift on surface characterization by SPM**

Y.H.Chen, J.Wang, W.H. Huang

Department of Precision Machinery and Instrumentation, University of Science and Technology of China, Hefei, China

Poster Session - Application

Poster No. **Titel**

39 **Application of metrology large range AFM for improving the nanoimprint lithography process**

G. Dai (1), M. Mühlberger (2), M. Rohn (2), H. Wolff (1), F. Pohlenz (1), H.-U. Danzebrink (1)

1) Physikalisch-Technische Bundesanstalt Braunschweig, Germany; 2) Profactor Produktionsforschungs GmbH, Steyr/Gleink, Austria

40 **Proximity effects calibration and correction for sub-40nm patterning**

P. Jedrasik (1), T. Dai (2)

1) Chalmers University of Technology, Göteburg, Sweden; 2) Tsunoda Dai,Nippon Control System Co., Yokohama-shi Kanagawa, Japan

41 **Measurements of small aspherical surfaces based on NMM**

X. Chen, Y. Wan, J. Zhao, W. Gu, Z. Zhu

Changchen Institute of Metrology & Measurement (CIMM), Beijing, China

42 **A new calibration structure for quantitative 3D SEM measurements with a 4-quadrant BSE-detector**

M. Hemmleb (2), M. Ritter (2), D. Berger (1), G. Dai (3), T. Dziomba (3), L. Koenders (3), 1) m2c microscopy measurement & calibration, Postdam, Germany; 2) Technische Universität Berlin, Germany; 3) Physikalisch-Technische Bundesanstalt Braunschweig, Germany

43 **Optical measurement of the diameter of micro spheres**

R. Bellotti, G.B. Picotto, F. Pollastri

Istituto Nazionale di Ricerca Metrologica, Torino, Italy

44 **Image Stitching Technology Applied to the Metrology of Sub-100 nm Linewidth**

J.R.Chen (1), C.C.A. Chen (1), H.C.Liou (2), S.P.Pan (2) , G.S. Peng (2)

1) Department of Mechanical Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan; 2) Center for Measurement Standards, Industrial Technology Research Institute, Hsinchu, Taiwan

45 **Use of High-Vacuum Magnetic Force Microscopy with External Magnetic Field for Ultra-High-Resolution Characterisation of Nanostructured Magnetic Materials.**

P. Zhdan, N. Nurgazizov

Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey, UK

46 **The Role of DNA Interactions in Microcantilever Deflection a Molecular Dynamic Approach**

M.A. Deriu (A, B), M. Merlo (A), M. Soncini (B), C. Bignardi (A), F.M. Montevecchi (A) , A. Redaelli (B)

A) Department of Mechanics, Politecnico di Torino, Turin, Italy; B) Department of Bioengineering, Politecnico di Milano, Milan, Italy

47 **Coordinate metrology using SPMs**

F. Marinello (1+2), Savio E. (2), Bariani P. (3), Carmignato S. (4)

1) CIVEN, Interuniversity Center for Nanotechnology, Italy; 2) Department of Manufacturing, Engineering and Management, University of Padova, Italy; 3) Schaefer South-East Europe s.r.l., Rovigo, Italy; 4) DTG, University of Padova,

48 **Automated nanoscale critical dimension measurements using a-priori-knowledge**

Christian Recknagel, Hendrik Rothe

H.-S. Universität, Hamburg, Germany

49 **Synthesis and characterization of Iron oxides nanoparticles**

I. Kazeminezhad (a), N. Jafarzadeh (b) , M. Nouri (c), N.Shahmiri Lakeh (b), O. M. Emamgholipour

a) Department of physics ,University of Chamran of Ahvaz , Iran; b) Azad University of Science and Research Branch, Ahvaz, Iran; c) University of Guilan, Iran

50 **Variable 2-point method for straightness profile measurement**

E.Okuyama

Akita University, Akita, Japan

51 **AFM characterization of Ti/Pd and Ti/Au bilayers for transition-edge sensors**

C. Portesi, E. Taralli, M. Rajteri, R. Rocci, G.B. Picotto and E. Monticone,

Istituto Nazionale di Ricerca Metrologica INRIM, Torino, Italy

52 **Preparation and characterization of straight silica nano-rods**

G.Zhu (1, 2), X. Zou (1), J. Cheng (1)

1) Research Center for Sensor Technology, Beijing Information Technology Institute, Beijing Key Lab.; 2) For Sensor Suzhou College Anhui

53 **Measurement of the long range speciment with nanoscale surface structures**

Z. Zhenyu

Changcheng Institute of Metrology and Measurement (CIMM), Beijing, China

Poster Session - Application

Poster No. **Titel**

54 **Structural Characterization of Polymorphic Tubulin Assemblies used as Metallization Templates**

W. Habicht, S. Behrens, K.J. Böhm, and E. Dinjus

Institute for Technical Chemistry, Forschungszentrum Karlsruhe, Karlsruhe, Leibnitz Institute for Age Research, Jena, Germany

55 **Optical profilometry on polycrystalline diamond surfaces: preliminary results.**

M. Vannoni, G. Molesini (1), S.Lagomarsino, S. Sciortino (2)

1) CNR – Istituto Nazionale di Ottica Applicata, Florence, Italy, 2) Department of Energetics and INFN, Florence Italy

56 **Iron oxide nanoparticle stacking in porous anodic alumina detected by magnetic and ferromagnetic resonance measurements**

M. Pasquale, E.S. Olivetti, M.Coïsson, G. Bertotti (1), P. Rizzi (2)

1) INRIM, Torino, Italy; 2) Università di Torino Dip. Chimica IFM, Torino, Italy

57 **Total Reflection of X-Rays Fluorescence (TXRF): a mature technique for environmental chemical nanoscale metrology**

L. Borgese (1), A. Zacco (1), E. Bontempi (1), R. Lucchini (2), N. Zimmerman (3), L. E. Depero (1)

1) INSTM and Chemistry for Technologies Laboratory, University of Brescia, Brescia, Italy; 2) Institute of Occupational Health, University of Brescia, Brescia, Italy; 3) Purdue University, School of Health Sciences, Mall Dr. West Lafayette, IN, United States

58 **A CRM of Spatial Resolution for 2d Dopant Profile in Semiconductor Devices**

Kyung Joong Kim (1), Soon Young Jung (1), Kihyun Kwon (1), Jong Jun An (2), Hae Seong Lee (2)

1) Korea Research Institute of Standards and Science, Daejeon, Korea; 2) Department of Nano & Advanced Materials Engineering, Jeonju University, Jeonju, Korea