

Minutes of the IUVSTA Education Committee
ECM 101
Ramada Plaza Hotel, Basel, Switzerland
Saturday 17 February 2007

1. The chairman of the Education Committee, Laszlo Kover, opened the meeting at 14.00.
2. Members present: Laszlo Kover (chair), David Sykes (secretary), Christoph Eisenmenger-Sittner, Ugo Valbusa, Joe Greene, Maria-Carmen Asensio, M-G Barthes, Jose Avila, Vladimir Matolin, Fabio Mazzolini, Nikola Radic, Robert Redhammer, Ron Reid, Janez Setina and Monika Janko. Observers present were: Mariano Anderle, John Grant, Bill Rogers, Hongjun Gao, Piere Strubin, Javaid Ahsan Bhatti, Ahmad Yar, J G Hou, Zhen-Chao Dong, Frank Richter, Karl Jousten, Christoph Hollenstein, Daniel Verniere, Lars Johansson, Marek Szymonski, Masatoshi Ono, Branko Pivac, J J Pireaux and Ki-Soo Sohn.
3. The agenda, which had been circulated previously, was adopted.
4. The minutes of the previous meeting (ECM-100-20-B-01)) were reviewed; Laszlo Kover noted that the minutes showed that the meeting lasted one hour more than it did and he asked the secretary to correct the time of the closure of the meeting from 16.54 to 15.54.
5. **Short Courses:** Laszlo Kover observed that the short courses planned for IVC17 had been discussed in the Congress Planning Committee and that information about them was available on the conference web site. He then asked M-G Barthes to say a few words about short courses organised by the French Vacuum Society. M-G Barthes reported that the SFV ran routinely some thirty different courses, these were mostly standard courses but some were tailored to individual companies. Some courses were held in the vacuum laboratory shared between the SFV and the University of Orsay.
6. **Technical Training Course Programme:** The Program Coordinator, Christoph Eisenmenger-Sittner presented a report (Appendix 1) on the Technical Training Course Programme. He reported that the budget of 15kSF for the triennium had been allocated and that all the sponsored courses, with one exception, had already taken place. The one exception was the Chinese course and the Chinese Vacuum Society had requested a postponement of the course until July. Reports on two successful courses had been received, one from Hungary where the TTC had attracted 109 participants and one

from Slovakia where 50 delegates had participated. Laszlo Kover asked if the TTC were carried out according to the IVVSTA rules and it was confirmed that this was the case. The committee accepted the two reports as well as the request of the Chinese Vacuum Society for the postponement of their TTC.

The procedure for applications for TTC funding was reviewed and the timeline from the call for applications being sent out to the date the final report was required by was described. The TTC Co-ordinator undertook to contact applicants with the decision of the ECM following the meeting at which their application was considered but noted that, should he fail to do so, the information was available in the minutes of the relevant ECM on the web site.

Marek Szymonski observed that the TTCs had been successful and the demand for the courses was high; he suggested asking the ECM to increase the budget for TTC funding in the next triennium.

Janez Setina reported that an application for a school/TTC had been sent to him, as chairman of VSTD, from Korea and he said he would discuss this further in the Division report. Mariano Anderle asked whether Korea was eligible for funding. Laszlo Kover explained that the criteria was based on the country's GNP per capita (GNPpC) being below the average value of the GNPpC of all the IUVSTA members and that Korea was a borderline case. The chairman undertook to re-examine the criteria.

7. Education Web Site: Laszlo Kover reported that he had had a request from M-G Barthes for an introduction to the material on the new education web site and that now there was a need to fill the technical pages. Links from the old web site had not yet been included on the new site and he proposed systematising the information with the following structure: databases; units; tutorials and lectures; schools; new educational activities; search engines. He remarked that the new web site still had the prices for transparencies from the old web site. Ron Reid commented that these were still available although not recommended; he reminded the chairman that he was describing features of the new web site, which the majority of the committee did not have access to and was still under development.

8. Visual Aids Programme: The existing topics were reviewed and a summary of the report from John Robins was presented. It was anticipated that modules 1,2,4 and 6 would be finished by the end of the triennium. Module 1 was completed. Module 2, the revised version had not been submitted. Module 3 was close to completion but had not progressed since ECM 92. Module 4, refereeing had been completed but the report not sent to the author. Module 5 was available for sale. Module 6 was

being refereed. Module 7 – no information. Module 8, revision of the old version nearing completion and would be available by ECM 102. Module 9, no progress since 2004. Module 10, no information. Module 11 had been progressed by Massimo Sancrotti and should now be considered as a new module.

Laszlo Kover then gave a brief report from the visual aids sub committee, which had met earlier in the day. The sub committee had been charged with implementing the resolutions from the previous meeting. It was proposed that a new Editorial Board be established (comprising Jean-Jacques Pireaux, Vladimir Matolin and Robert Redhammer) which would be responsible for the new modules and slide libraries. Laszlo Kover thanked the sub committee and M-G Barthes for their work. The tasks for the new Editorial Board were: 1) to review and revise the guidelines; 2) to set a framework and timeline for the development of new material; 3) to select topics and authors and to offer invitations to authors with the expectation of a six months delivery time. The new modules would be available free of charge or at cost. Referees would be chosen by the Editorial Board based on recommendations from the STD Divisions, who would also be expected to recommend topics for new modules. The sub committee had requested a review of the existing modules and asked M-G Barthes to write to John Robins on their behalf. The Education Committee approved the proposals of the sub committee unanimously. Bill Rogers asked if responsibility had now shifted from John Robins to the new board. It was expected that John Robins will complete the work on the old modules but that new modules will be the responsibility of the Editorial Board. Laszlo Kover expressed his hope to see the old modules of high enough standard on the web site by the next ECM, Bill Rogers cautioned against putting poor material on the web site. Mariano Anderle spoke in favour of new modules from the frontiers of research and not re-iteration of old material that already existed. Vladimir Matolin asked who would be the customers for the material and Laszlo Kover replied that there would be many emphasising that the material was not for specialists but those at a basic level.

9. Building New Contacts in Non Member Countries: It was reported that Maria Carmen Asensio had been involved in an international Thin Film Conference (ICSFS-13) in Patagonia (Bariloche, Argentina) along with other colleagues from the Union; there had been some 350 attendees at the conference. Laszlo Kover noted that the Baltic Countries will be well represented in IVC 17. Monika Jenko had made contacts in Bosnia Herzegovina through a project on education in vacuum technology and courses were being given in the local language, mention was made of establishing new vacuum societies. Hongjun Gao was concentrating on Asia and had met with scientist in Singapore although more time was required to build on these contacts.

10. **Support of Activities in Member Societies:** Laszlo Kover asked Matt Ono to report on activities in Japan. Jianguo Hou reported that two events had taken place in China, a Summer School for high school students and a Technical training Course for technicians and others from universities.

11. **Any Other Business:** There was no other business.

12. **Close:** Laszlo Kover thanked the members of the committee for their continued support and closed the meeting at 15.05

Appendix 1

IUVSTA EDUCATION COMMITTEE ACTIVITY REPORT ON IUVSTA TECHNICAL TRAINING COURSES (IUVSTA TTC's)

October 2006 - February 2007

1. State at January 31st, 2007

At the IUVSTA General Meeting held in Venice, June 30, 2004, it was decided that in the 2004 - 2007 triennium a sum of 15.000 CHF is the budget for IUVSTA Technical Training Courses. Until ECM-100 four IUVSTA TTC's were granted for the Polish Vacuum Society, the Hungarian Vacuum Society, the Chinese Vacuum Society and the Slovak Vacuum Society. This exhausted the Budget for the IUVSTA TTC's (apart from a remaining small amount of CHF 400.--). Therefore no calls for applications for IUVSTA TTC's were distributed in the time between ECM-100 and ECM-101.

2. Finished TTC's:

All TTC's applied for were held before ECM-101. The Polish Vacuum Society filed a report which was presented at ECM-100. The Hungarian and the Slovak Vacuum Society filed reports which are attached to this file.

The Chinese Vacuum Society claimed that it did not receive a financial support from IUVSTA since it was not informed about the acceptance of their proposal at ECM-100. The Chinese Vacuum Society asked for a postponement of this Course to July. As a result of this matter, a detailed timeline for a TTC will be given in the point "miscellaneous" of this report.

2. 1. Hungarian Vacuum Society:

The TTC of the Hungarian Vacuum Society was held in the Institute of Nuclear Research (ATOMKI), Bem tér 18/C, 4026 Debrecen, Hungary, from October 9-13, 2006. The number of participants was 109 persons. The detailed report to this event is given in attachment 1.

2. 2. Pakistan Vacuum Society:

The long standing issue of the Pakistani TTC came to a satisfying conclusion at ECM 100. Dr. Javaid Bhatti, President of the Pakistan Vacuum Society gave a brief report on the Pakistani TTC held from September 5 - 6 in Islamabad: the Pakistan Vacuum Society organized a two day training workshop under the title PVS-IUVSTA-TTC from Sept. 5 - 6, 2006 at the Hotel Best Western, Islamabad. Although the event was fee based, the PVS committee released limited grants to selected people from industry and educational institutions out of IUVSTA funds by a PVS committee formed for the specific purpose according to the IUVSTA rules.

This event was held separately in parallel to the PVS National event on Vacuum Coatings from Sept. 5-9, 2006 in the same hotel.

2. 3. Slovak Vacuum Society:

The TTC of the Slovak Vacuum Society was held from 8 – 12.november 2006 in Štrbské Pleso in the high Tatra mountains. 50 participants attended the course. There were 16 students of university study programs, 10 PhD students and 15 participants from industry who were dealing with vacuum technology in their everyday professional life. Also 9 coworkers and technicians from the universities and research institutions did participate. A detailed report to this event is given in attachment 2.

3. Miscellaneous:

3. 1. Timeline for a TTC from the call for applications to the final report:

Regarding the issue of the Chinese Vacuum Society presented earlier this point gives the complete timeline of a TTC:

1. Call for applications: issued periodically to eligible member societies, approximately twice between two ECM's, as long as funds are available. Eligibility is based on the criterion that the Gross National Product per Capita (GNPpC) of the respective country is below the average value of the GNPpC of all IUVSTA members. Information about the form of a typical application is attached to the call.
1. Submission of applications to the person in charge of the TTC Programme (Christoph Eisenmenger-Sittner, christoph.eisenmenger@ifp.tuwien.ac.at for the triennium 2004 - 2007) until 2 weeks before the ECM following the call.
3. Acceptance/Rejection of the application at ECM.
4. Information of the applicants about acceptance/rejection: **Basically this information should be obtained from the minutes of the ECM where the proposal was considered.** Nonetheless the person in charge of the TTC Programme (Christoph Eisenmenger-Sittner, christoph.eisenmenger@ifp.tuwien.ac.at for the triennium 2004 - 2007) should inform the applicants separately by e-mail. **Please note that this is an optional procedure. If you do not receive this information please check the minutes or get in contact with the person in charge!**
5. Contact of the organizers with the treasurer concerning the transfer of the grant.
6. Organization of the TTC.
7. Submission of a report at the ECM following the TTC.

3. 2. Update of the list of member societies eligible for a TTC:

The list of eligible member societies was updated in Jan. 2007. There were only very slight changes. Korea entered the list of eligible countries, which is given in the following.

Croatia
Brazil
Czech Republic
India
Korea
Mexiko
P.R. China
Pakistan
Poland
Portugal
Russian Federation
Slovakia
Ukraine

4. Attachments:

4. 1. Report of the Hungarian Vacuum Society

REPORT

on IUVSTA TECHNICAL TRAINING COURSE (ITTC) IN HUNGARY, 2006

1. TITLE, LOCATION AND DATE OF ITTC

TRAINING COURSE ON PRACTICAL VACUUM TECHNIQUE
held in Institute of Nuclear Research (ATOMKI), Bem tér 18/C, 4026 Debrecen, Hungary,
October 9-13, 2006

2. ORGANIZER

Organization:

Division of Vacuum Physics, Technology and Application of Roland Eötvös Physical Society (DVPTA of REPS), Budapest, Fő u. 68, H-1027 Hungary

Responsible person:

Dr. Sándor Bohátka
President of DVPTA of REPS

3. INTENT OF THE COURSE

There is no up-to-date comprehensive material on vacuum physics and -technique in Hungarian. Teaching is available only at some universities and in big companies, but it is selected and adapted to local needs in both cases. Education and training of technicians, postgraduate students, engineers and scientists working in vacuum-related fields is the aim of this course. It is a stand-alone course.

4. TEACHERS:

Dr. Sándor Bohátka, senior scientist, ATOMKI (Chapter 1-13, 15),
Dr. Gábor Langer, senior scientist, Solid State Physics Department of Debrecen University (Chapter 14, 15),

Dr. Dezső Varga, senior scientist, ATOMKI (Chapter 15).

5. LANGUAGE: Hungarian

6. PROGRAM OF THE COURSE

Lectures: 31 hours, demonstration in laboratories: 2 hours.

1. Brief overview on the history and applications of vacuum technique
2. Fundamentals of the kinetic theory of gases
 - Model of the ideal gas
 - Distribution of velocities
 - Pressure
 - Wall flux density
 - Even distribution of energy
 - Mean free path, collision rate
9. Transport phenomena
 - Diffusion
 - Internal friction in gases
 - Thermal conduction in gases
13. Interaction of gases and condensed matter
 - Possible sources of gases in a vacuum vessel
 - Vapours, evaporation, condensation
 - Sorption phenomena
 - Permeation
18. Total pressure gauges
 - Mechanical vacuum gauges
 - Viscosity vacuum gauge
 - Liquid level manometers
 - Thermal conductivity vacuum gauges
 - Ionisation vacuum gauges (hot and cold cathode types)
24. Partial pressure measurement (mass spectrometers)
 - Brief overview on the different types
 - Practical aspects, residual gas analysis
27. Leak detection methods, apparatus and practice
28. Flow of gases
 - Gas flow, pumping speed, throughput
 - Flow resistance and conductivity, effective pumping speed
31. Flow through apertures and pipes, pump-down time of the recipient
32. Pumps (with special attention to oil-sealed and dry techniques)
 - Positive displacement pumps
 0. alternating displacement pumps
 0. rotary displacement pumps
 - Fluid entrainment pumps
 - Molecular pumps
 - Sorption pumps
 - Cryopumps
40. Vacuum systems
 - Examples of real systems for different pressure ranges
 - Hints on operation
43. Technical aspects
 - Materials used in vacuum technique
 - Accessories

- Junctions, seals, feedthroughs
 - Cleaning
13. Calculation of basic quantities (pumping speed required in a system, pipe dimensions, etc)
1. Thin films
 - . Film preparation
 - . Physical vapour deposition (evaporation, sputtering, molecular-beam epitaxy – MBE)
 - . Chemical vapour deposition (vapour-phase deposition, electrolytic and chemical deposition)
 - . Structure of thin films: amorphous, polycrystalline and single crystal layers, multilayer structures, textures.
 - . Survey of methods for studying thin film-structures: electron diffraction, electron microscopy, X-ray diffraction, surface-analytical methods: electron microprobe, Auger spectroscopy, ESCA, SIMS.
 - . Development of structures: nucleation, vapour-liquid-solid phase transition, mechanism of growth of amorphous and crystalline phases, coalescence, formation of textures and morphologies, role of additives and impurities, planning of films with various structures and properties, nanocrystalline layers, interface reactions. Relation between structures and properties.
 - . Applications: surface protective coating, optical coatings, magnetic materials for recording, microelectronics.
 2. Demonstration in laboratory
 - . Demonstration of high vacuum and ultrahigh vacuum pumps, accessories and systems; a quadrupole mass spectrometer; an electron spectrometer system; thin film production with magnetron sputtering; SIMS, SNMS; X-ray diffraction.
 - . Leak detection with Pirani and ionisation gauge, and mass spectrometer.

Detailed program and timetable in Hungarian are attached.

7. ATTENDANCE

Technicians, engineers, postgraduate students and scientists working in production, research and teaching: 109 persons (***list of the participants is attached.***)

8. RESULTS OF THE COURSE

This course covered the most important fields of vacuum physics and -technique as well as the methods of production and analysis of thin films. Those who attended this course have got an explanation of the theoretical basics of vacuum physics (kinetic theory of gases, transport phenomena, flow of gases, interaction of gases and condensed matter); the working principle and practical operation of all existing pumps and gauges was explained as well as how to build vacuum systems for various purposes; an overview was given on materials, components and accessories of vacuum technique, and practical cleaning methods were also advised. Calculation of the main parameters of a vacuum system completed the theoretical description. An overview was given on the production of thin films, mechanical, electrical, magnetic and optical properties of thin films and on the analytical methods characterizing thin films. Vacuum systems, elements and accessories, methods and operating systems of electron spectrometry and mass spectrometry were demonstrated in laboratories.

Participants were satisfied with the comprehensive material and practical advice. Many of them worked without special training in the given field.

Additional value of the course: the individuals who work separately could make contacts.

Participants unanimously asked for a written version of the course. The organiser promised to prepare a printed version of the vacuum part of the course in the first half of 2007. The slides of the course were also offered to the Pannon University helping them in launching vacuum technique as a new subject in their programme.

Participants received a certificate on completing this course.

7. FINANCES:

All support from IUVSTA was spent for the accommodation of 22 participants. Only a portion of the participants could get support but people coming from non-profit organizations were given preference, and all such requests were complied with.

Total IUVSTA financial support: 3600,- CHF = 629 712,- HUF

The support was spent on the accommodation of 22 participants in Centrum Panzió, Debrecen (22 x 4 nights; 43.22 CHF/night):

665 280,- HUF

(The missing 35 568,- HUF was supplied by R. Eötvös Physical Society.)

IUVSTA support spent on each participant who received the support: 163.64 CHF.

The list of 22 participants receiving financial support from IUVSTA is attached. Signed confirmations of 22 participants receiving IUVSTA support are attached.

Please find attached:

1. List of the program of the ITTC (in Hungarian)
2. Timetable of the ITTC (in Hungarian)
3. List of the participants
4. List of 22 participants who received financial support from IUVSTA
5. Signed confirmations of 22 participants receiving IUVSTA financial support

Debrecen, January 26, 2007

The organizers and the participants are grateful to IUVSTA for the financial support and the valuable encouragement to organize this technical course.

Sándor Bohátka
Organizer of ITTC
President of DVPTA of REPS
Alt. Councillor, Hungary

4. 1. Report of the Slovak Vacuum Society

IUVSTA Technical Short Course Grant in 2006

For the Slovak Vacuum Society

Report for IUVSTA

Course location: **Štrbské Pleso**, Vysoké Tatry, **Slovak Republic**, stand-alone course.

Tentative time: **8 – 12.november 2006**

Title of the course: **Course of Vacuum Technology**

A Course of Vacuum Technology was organized by Slovak Vacuum Society during the period of 8th to 12th November 2006. This course was organized with support of IUVSTA as a Technical Training Course. The venue was the Tourist Center Strbske Pleso in High Tatra Mountains.

Altogether 50 participants attended the course. There were 16 students of university study programs, 10 PhD students and 15 participants from industry who were dealing with vacuum technology in their everyday professional life. The list of participants with signatures is enclosed. Also 9 coworkers and technicians from the universities and research institutions did participate.

The course was divided into 5 thematic modules:

- Basic physical processes relevant for vacuum technology
- Methods and devices for obtaining vacuum
- Measurement of pressure
- Vacuum based modern technology in electrical and industrial engineering
- Calibration in vacuum technology

The modules were given by speakers: prof. Štefan Bederka, PhD., prof. Viera Dubravcová, PhD., prof. Marian Veselý, PhD., prof. Robert Redhammer, PhD., Dr. Ján Krč-Turba, Dr. Jozef Ivan and Dr. František Kolenič from institutions Slovak University of Technology, OSRAM Slovakia, VUZ Bratislava and SMÚ Bratislava.

The course was completed by written exam. A certificate was the reward for successful participation. Each participant has received The Proceedings of all contributing lectures.

Thanks to IUVSTA support 26 students could take part in this course. The IUVSTA grant has covered board and lodging in Banik Hotel at Strbske Pleso. The budget of the course was as follows:

Board and lodging for students and PhD. students, total	86 370.- SKK
IUVSTA contribution to that	75 089.- SKK
Slovak Vacuum Society contribution	11 281.- SKK

Participants did cover their travel expenses by themselves. Despite this the whole event was very positively evaluated by the participants. Slovak Vacuum Society does have already some experience with these types of activities. Therefore we plan in the future to continue with similar events.

Enclosures:

- List of participants
- Proceedings
- A copy of the Certificate

SVS organizers