



**21st Symposium of AER on  
VVER Reactor Physics and Reactor Safety  
Dresden, September 19 - 23, 2011**

**Agenda**

**Monday, September 19**

**8:30 Registration**

**9:30**

- 0.1 Opening and Welcome,  
*S. Kliem, HZDR, Germany*
- 0.2 Overview on the Institute of Safety Research within the Helmholtz-Zentrum Dresden- Rossendorf,  
*S. Kliem, HZDR, Germany*
- 0.3 Publication possibilities for AER scientific papers,  
*A. Aszodi, Budapest University of Technology and Economics, Hungary*

**10:40 Coffee break**

**11:10 Session 1 - Session chair: T. Simeonov**

- 0.4 Safety assessment of the German NPPs after the Fukushima accident,  
*A. Pautz, GRS, Germany*

***Topic 2 Reactor physics experiments and code validation***

- 2.1 "Full-Core" - VVER-440 core periphery power distribution benchmark proposal,  
*V. Krýsl, P. Mikoláš, D. Sprinzl, J. Švarný, ŠKODA JS a.s., Czech Republic*
- 2.2 Calculations of fission rate distribution in the core of VVER-1000 mock-up on the LR-0 reactor using alternative methods and comparison with results of measurements,  
*S. Zaritskiy, A. Kovalishin, T. Tsvetkov, NRC "Kurchatov Institute", Russia*
- 2.3 Qualification of the APOLLO2 lattice physics code of the NURISP platform for VVER hexagonal lattices,  
*A. Keresztúri, G. Hegyi, Á. Tóta, KFKI Atomic Energy Research Institute, Hungary*

**12:45 Lunch**

**14:00 Session 2 - Session chair: A. Keresztúri**

- 2.4 The simplified P3 approach on a trigonal geometry in the nodal reactor code DYN3D,  
*S. Duerigen, E. Fridman, HZDR, Germany*
- 2.5 Solution of the "MIDICORE" VVER-1000 core periphery power distribution Benchmark by KARATE and MCNP,  
*E. Temesvári, G.Hordósy, G. Hegyi, Cs.Maráczy, KFKI Atomic Energy Research Institute, Hungary*
- 2.6 Solutions for the task 1 and task 2 of the benchmark for core burnup calculations for a VVER-1000 reactor, T. Lötsch, V. Khalimonchuk, A. Kuchin,  
*TÜV SÜD Industrie Service GmbH, Germany*
- 2.7 Overview of the validation of a new 3-D neutronics model in APROS,  
*J. Rintala, VTT, Finland*

**15:40 Coffee break**

**16:10 Session 3 - Session Chair: I. Ovdiienko**

***Topic 1 Spectral and core calculations***

- 1.1 Information about AER WG A on improvement, extension and validation of parametrized few-group libraries for VVER 440 and VVER 1000,  
*P. Mikoláš, SKODA JS a.s., Czech Republic*
- 1.2 HELIOS: Application for criticality limits assessment,  
*T. Simeonov, Studsvik Scandpower GmbH, Germany*
- 1.3 A comparison of the FA's models with the detailed and simplified description of the design elements in calculations by MCU code,  
*A.S. Bikeev, S.V. Marin, E.A. Sukhino-Khomenko, NRC "Kurchatov Institute" Moscow, Russia*
- 1.4 Development of multi-group spectral code TVS-M,  
*A.P. Lazarenko, A.V. Pryanichnikov, NRC "Kurchatov Institute" Moscow, Russia*

## Tuesday, September 20

### **9:00 Session 4 - Session Chair: P. Mikoláš**

#### ***Topic 1 Spectral and core calculation***

- 1.5 An analytical solution for the consideration of the effect of adjacent fuel elements; extension to hexagonal fuel elements,  
*B. Merk, U. Rohde, HZDR, Germany*
- 1.6 The influence of the small radial FAs displacements on the power distribution in the VVER-cores,  
*E.A. Sukhino-Khomenko, NRC "Kurchatov Institute" Moscow, Russia*
- 1.7 On solution to the problem of reactor kinetics with delayed neutrons,  
*J. Kyncl, Nuclear Research Institute Řez, Czech Republic*
- 1.8 Influence of spectral history on full core calculation results,  
*Y. Bilodid, S. Mittag, HZDR, Germany*

### **10:40 Coffee break**

### **11:10 Session 5 - Session Chair: A.P. Lazarenko**

- 1.9 Effect of burnup history by moderator density on neutron-physical characteristics of WWER-1000 core,  
*I. Ovdiienko, A. Kuchin, V. Khalimonchuk, M. Ieremenko, SSTC NRS Kiev, Ukraine*
- 1.10 The development of the code package PERMAK-3D/SC-1,  
*P.A. Bolobov, D.A. Oleksyuk, NRC "Kurchatov Institute" Moscow, Russia*

#### ***Topic 7 Engineering factors***

- 7.1 Information about Group H meeting,  
*L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia*
- 7.2 Estimation procedure for engineering margin factors of VVER fuel cycles,  
*V.G. Dementiev, D.A. Oleksuk, L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia*

### **12:45 Lunch**

### **14:00 Session 6 - Session Chair: R. Zajac**

#### ***Topic 3 Core design, monitoring and fuel management***

- 3.1 AER Working Group C activities in 2011 (oral presentation, only),  
*I. Nemes, Paks NPP, Hungary*
- 3.2 In-core control system modernization experience on WWER-1000 units,  
*A. Bykov, SNIIP Atom Ltd. Moscow, Russia*

- 3.3 Status and prospects of the core surveillance system SCORPIO-VVER in Czech Republic and Slovakia,  
*J. Molnar, R. Vocka, Nuclear Research Institute Řez, Czech Republic*
- 3.4 Role of the team of scientific and technical commissioning support during Mochovce NPP Unit3&4 commissioning,  
*J. Hermanský, M. Prachár, M. Sedláček, VUJE Inc., Slovakia*

**15:40 Coffee break**

**16:10 Session 7 - Session Chair: J. Molnar**

- 3.5 AER Working Group B activities in 2011,  
*P. Darilek, VUJE Inc., Slovakia*
- 3.6 15m-cycle option for NPP Paks operation,  
*I. Nemes, Paks NPP, Hungary*
- 3.7 Experience of TVSA fuel implementation at Kozloduy NPP,  
*K. Kamenov, Al. Kamenov, D. Hristov, Kozloduy NPP, Bulgaria*
- 3.8 Implementation of 5-year fuel cycle strategy for control fuel assemblies at Dukovany NPP,  
*J. Bajgl, ČEZ, a.s., Dukovany NPP, Czech Republic*

## Wednesday, September 21

**9:00**            **Session 8 - Session Chair: I. Nemes**

### ***Topic 3        Core design, monitoring and fuel management***

- 3.9     New practice for the evaluation of rod efficiency measurement by rod drop at the NPP Paks,  
*I. Pócs, T. Parkó, Paks NPP, Hungary*
- 3.10   VVER 440 fuel cycles optimization by the ATHENA code,  
*J. Prehradný, SKODA JS a.s., Czech Republic*
- 3.11   Some remarks to the pin-wise power distribution behavior in L<sup>3</sup>P core designs,  
*M. Fiala, ČEZ, a.s., Dukovany NPP, Czech Republic*

### ***Topic 5        Spent fuel disposal, actinide transmutation***

- 5.1     AER Working Group E activities in 2011,  
*V. Chrapciak, VUJE Inc., Slovakia*

**10:40**           **Coffee break**

**11:10**           **Session 9 - Session Chair: J. Bajgl**

- 5.2     Criticality safety analysis of fresh and spent fuel storage and handling for NPP Mochovce using MCNP5,  
*G. Farkas, J. Haščík, J. Lüley, B. Vrban, M. Petriska, V. Slugeň, P. Urban, Slovak University of Technology in Bratislava, Slovakia*
- 5.3     VVER-440 with viable direction to sustainability,  
*P. Darilek, C. Strmensky, R. Zajac, J. Majercik, VUJE Inc., Slovakia*
- 5.4     Comparison of square and hexagonal fuel lattices for high conversion PWRs,  
*D. Kotlyar, E. Shwageraus, Ben-Gurion University of the Negev, Israel*
- 5.5     ALLEGRO - Introduction to GFR,  
*P. Darilek, R. Zajac, VUJE Inc., Slovakia*

### ***Topic 7        Engineering factors***

- 7.3     Account for uncertainties of control measurements in estimations of design margin factors,  
*V.G. Dementiev, V.D. Sidorenko, L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia*
- 7.4     Specific features of accounting for probable power excursions at periphery FAs, which are caused by FA gaps behaviour in the course of VVER-1000 operation,  
*E.F. Michailov, L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia*

**13:15**           **Lunch**

**15:00**      **Sightseeing tour Dresden (2-hour guided walk)**  
**Start at hotel reception**

**19:00**      **Dinner**  
**Restaurant “Festungsmauern” Am Brühlschen Garten 4, Dresden**

## Thursday, September 22

### **9:00 Session 10 - Session Chair: U. Rohde**

#### ***Topic 1 Spectral and core calculation***

- 1.11 Steps ahead in the few-group cross-section library generation at the pin level,  
*N. Petrov, J-J. Herrero, INRNE Sofia, Bulgaria*
- 1.12 Advanced calculation schemes and cross-section library generation in hexagonal geometry with APOLLO2,  
*G. Todorova, N. Petrov, N. Zheleva, N.P. Kolev, F. Damian, INRNE Sofia, Bulgaria*

#### ***Topic 4 Reactor dynamics and safety analysis***

- 4.1 AER Working Group D on VVER safety analysis – report of the 2011 meeting,  
*S. Kliem, HZDR, Germany*
- 4.2 Preliminary results of the seventh three-dimensional AER dynamic benchmark problem calculation. Solution of problem with DYN3D- and RELAP5-3D-codes,  
*M. Bencik, J. Hádek, Nuclear Research Institute Řez, Czech Republic*

### **10:40 Coffee break**

### **11:10 Session 11 - Session Chair: A. Aszódi**

- 4.3 Simulation of AER-7 benchmark with the coupled code DYN3D/ATHLET,  
*Y. Kozmenkov, S. Kliem, HZDR, Germany*
- 4.4 COBAYA3/FLICA4 vs. DYN3D/FLOCAL Solutions of the VVER-1000 MSLB benchmark,  
*I. Spasov, T. Tzanov, N. Kolev, J. Hadek, INRNE Sofia, Bulgaria*
- 4.5 Modeling the spatial distribution of the parameters of the coolant in the reactor volume,  
*S.P. Nikonov, NRC "Kurchatov Institute" Moscow, Russia*
- 4.6 Comparisons with measured data of the simulated local core parameters by the coupled code ATHLET-BIPR-VVER applying a new enhanced model of the reactor pressure vessel,  
*S.P. Nikonov, I. Pasichnyk, K. Velkov, GRS, Germany*

### **12:45 Lunch**

### **14:00 Session 12 - Session Chair: S. Kliem**

- 4.7 WVER safety analysis in case of simultaneous positive reactivity introduction by control rods withdrawal and pure condensate injection,  
*A. Kuchin, I. Ovdiienko, V. Khalimonchuk, SSTC NRS Kiev, Ukraine*
- 4.8 Study on severe accidents and countermeasures for VVER-1000 reactors using the integral code ASTEC,

*P. Tusheva, N. Reinke, F. Schäfer, E. Altstadt, S. Kliem, HZDR, Germany*

- 4.9 Computational and design considerations for innovative Light Water Reactor with natural circulation ,

*A. Soldatov, T. S. Palmer, Oregon State University, USA*

- 4.10 Studies on boiling water reactor design with reduced moderation and analysis of reactivity accidents using the code DYN3D-MG,

*U. Rohde, HZDR, Germany*

**15:40 Coffee break**

**16:10 Session 13 - Session Chair: T. Lahtinen**

- 4.11 Application of DYN3D/ATHLET and DYN3D/RELAP5 coupled codes to simulation of RUTA-70 reactor with CERMET fuel,

*Y. Kozmenkov, Y. Baranaev, A. Glebov, U. Rohde, HZDR, Germany*

**Topic 6 Nuclear applications of three dimensional thermal hydraulics**

- 6.1 AER Working Group G activities in 2011,

*A. Aszódi, Budapest University of Technology and Economics, Hungary*

- 6.2 Investigation of coolant mixing in VVER-440/213 RPV with improved turbulence models,

*B. Kiss, A. Aszódi, Budapest University of Technology and Economics, Hungary*

- 6.3 New studies of the natural convection around the fuel rod model of the BME training reactor with PIV/LIF technique,

*R. Szijártó, A. Aszódi, B. Yamaji, Budapest University of Technology and Economics, Hungary*



## Friday, September 23

**9:00**      **Session 14 - Session Chair: K. Velkov**

### **Topic 6**      ***Nuclear applications of three dimensional thermal hydraulics***

- 6.4      Effect of spacer grid mixing vanes on coolant outlet temperature distribution,  
*T. Rämä, T. Lahtinen, Fortum Power and Heat Ltd., Finland*
- 6.5      Analysis of coolant flow in central tube of VVER-440 fuel assemblies,  
*G. Zsíros, S. Tóth, A. Aszódi, Budapest University of Technology and Economics, Hungary*
- 6.6      Analysis of C1 experiment on UPTF facility with an advanced ATHLET model,  
*I. Pasichnyk, K. Velkov, S.P. Nikonov, GRS, Germany*
- 6.7      A proposal to continuation of VVER-440 fuel assembly head benchmark,  
*A. Aszódi, S. Tóth, Budapest University of Technology and Economics, Hungary*

**10:40**      **Coffee break**

**11:10**      **Session 15 - Session Chair: K. Velkov**

### **Topic 5**      ***Spent fuel disposal, actinide transmutation***

- 5.6      Summary of 13th session of the AER Working Group F- "Spent fuel transmutations" and 4th meeting of INPRO project RMI – "Meeting energy needs in the period of raw materials insufficiency during the 21st century",  
*V Lelek, Nuclear Research Institute Řez, Czech Republic*
- 5.7      Strategies of the future technological development,  
*V. Lelek, Nuclear Research Institute Řez, Czech Republic*

### ***General discussion and closure of the Symposium***

**12:45**      **Lunch**