UNIVERSITÀ DI PISA

Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

INTERNATIONAL WORKSHOP ON INNOVATIVE NUCLEAR REACTORS COOLED BY HEAVY LIQUID METALS: STATUS AND PERSPECTIVES

ADP ENEA-MSE (PAR2011-LP3)

&

FP7 EC Collaborative Project "SEARCH"

Pisa, April 17th–20th, 2012

University of Pisa, Engineering Faculty

Largo Lazzarino 1, Pisa, Italy

An International Workshop on "INNOVATIVE NUCLEAR REACTORS COOLED BY HEAVY LIQUID METALS" has been organized in Pisa (Italy) by ENEA, SCK-CEN, Von-Karman Institute and University of Pisa.

The workshop, supported in the frame of the Program Agreement (ADP ENEA-MSE, PAR2011) between the ENEA and the Italian Minister for the Economic Development (MSE) and in the frame of the SEARCH Collaborative Project (FP7, EC) deals with relevant topics for nuclear fast reactor systems and accelerator driven systems.

Beyond the detailed description of the main design options for innovative nuclear systems cooled by heavy liquid metal, specific topics, such as core design, advanced fuel, reactor components, coolant chemistry, thermal-hydraulics and safety assessment will be presented and discussed.

The outcomes of the Workshop have a double goal.

First, to support the implementation of the Front-End Engineering Design (FEED) and the Preliminary Safety Assessment Report (PSAR) of MYRRHA irradiation facility, which has a fundamental deadline in 2014.

Second, to promote the Lead Technology as reference, together with the Sodium Technology, into the European strategy related to the Fast Reactors, outlining the strong Italian contribution in this frame.

Workshop Committee

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TENTATIVE AGENDA

TUESDAY, APRIL 17TH, 2012

8,45	**REGISTRATION**

	TIME-TABLE	TOPICS	SPEAKERS
		WELCOMING SESSION	
	9,30	Welcoming address	M. Filippeschi (*Mayor of Pisa*) Representative of UNIPI G. Forasassi (*CIRTEN President*) P. Maranesi (*ENEA Deputy Commissioner*)
		OPENING SESSION	
1.1	**10,00**	The Italian Strategy towards the GEN IV Nuclear Installation Development	M. Uccellatore (MIUR)
1.2	**10,25**	Status and Perspectives in Europe for the Nuclear Development	M. Deffrennes (EC)
	SESSION 1	**LMFR GENERAL OVERVIEW**	
1.3	**11,15-11,40**	LMFR Worldwide Overview	A. Stanculescu (INL)
1.4	**11,40-12,05**	LMFR Development: status and perspectives in Japan	M. Takahashi (NR-TITECH)
1.5	**12,05-12,30**	LMFR Development: status and perspectives in Korea	S.-G. Lee (SNU)
	12,30-13,30	**Welcome Buffet**	
1.6	**13,30-13,55**	LMFR Development: status and perspectives in USA	C. Smith (LLNL)
1.7	**13,55-14,20**	LMFR Development: status and perspectives in Russia	V. Smirnov (NIKIET)
1.8	**14,20-14,45**	Toward the HLM technology development in China: the FDS strategy & overview.	Y. Wu (FDS-Team)
1.9	**14,45-15,10**	European Strategy for LFRs Development	A. Alemberti (ANN)
1.10	**15,10-15,35**	Liquid Metal Technology and LFR Design in Italy	P. Agostini (ENEA)
1.11	**15,35-16,00**	The CIRTEN contribution to the LMFR development	G. Forasassi (CIRTEN)
	16,00-16,40	**Coffee-break**	
1.12	**16,40-17,05**	Liquid Metal Technology Programs in Germany	C. Fazio (KIT)
1.13	**17,05-17,30**	LFR Overview: Perspectives and Challenges	L. Cinotti (MERIVUS)
1.14	**17,30-17,55**	LFR and SFR Synergies and Commonalities	C. Latgè (CEA)
1.15	**17,55-18,20**	MYRRHA Irradiation Facility	P. Schuurmans (SCK-CEN)
	18,20	**Adjourn**	

WEDNESDAY, APRIL 18TH, 2012

	SESSION 2	**EUROPEAN LEAD COOLED FAST REACTOR – ELFR -**	
2.1	**9,00-9,25**	ELSY Project	L. Cinotti (MERIVUS)
2.2	**9,25-9,50**	ELFR System Configuration and Main Components	L. Mansani (ANN)
2.3	**9,50-10,15**	ELFR-DEMO: ALFRED System Configuration	A. Alemberti (ANN)
2.4	**10,15-10,40**	ELFR & DEMO core design	G. Grasso (ENEA)
	10,40-11,05	**Coffee-break & Poster Session**	
	SESSION 3	**ELECTRA CONCEPT: EDUCATION & TRAINING FACILITY**	
3.1	**11,05-11,30**	ELECTRA System Overview	J. Wallenius (KTH)
3.2	**11,30-11,55**	Structural Materials for ELECTRA	P. Szakalos (KTH)
	SESSION 4	**MYRRHA CONCEPT**	
4.1	**11,55-12,20**	Towards the MYHRRA feasibility: SEARCH Project	P. Schuurmans (SCK-CEN)
4.2	**12,20-12,45**	MYRRHA system configuration	P. Schuurmans (SCK-CEN)
4.3	**12,45-13,10**	MYRRHA core design	M. Sarotto (ENEA)
	13,10-14,15	**Lunch (buffet) & Poster Session**	
	SESSION 5	**FUEL FOR LMFR**	
5.1	**14,15-14,40**	LFR fuel overview and perspectives	D. Manara (ITU)
5.2	**14,40-15,05**	Preliminary Discussion on LFR Fuel Pin Design: Current Status, Fuel Modeling and Open Issues	D. Rozzia (UNIPI-ENEA)
5.3	**15,05-15,30**	Fuel- Coolant interaction	T. Retegan (Chalmers)
5.4	**15,30-15,55**	Electra innovative Fuel	M. Jolkkonen (KTH)
	15,55-16,20	**Coffee Break & Poster Session**	
	SESSION 6	**STRUCTURAL MATERIALS AND COOLANT CHEMISTRY**	
6.1	**16,20-16,45**	European Framework: EERA Nuclear Materials	C. Fazio (KIT)
6.2	**16,45-17,10**	LMFR Cladding and in-core structure development	M. Le Flem (CEA)
6.3	**17,10-17,35**	Corrosion in HLM systems	A. Weisenburger (KIT)
6.4	**17,35-18,00**	Mechanical Properties of Structural Materials in HLM	J. Van den Bosch (SCK-CEN)
	18,00	**Adjourn**	

THURSDAY, APRIL 19TH, 2012

	SESSION 6	**STRUCTURAL MATERIALS AND COOLANT CHEMISTRY**	
6.5	**8,35-9,00**	Oxygen Control System for HLM systems	J. Van den Bosch (SCK-CEN)
6.6	**9,00-9,25**	Coating characterization for LFR applications	A. Gessi (ENEA)
6.7	**9,25-9,50**	Codes & Rules for Gen-IV nuclear system design	D. Bernardi (ENEA)
	SESSION 7	**LIQUID METAL THERMAL-HYDRAULICS**	
7.1	**9,50-10,15**	LMFR Thermal-hydraulic challenges	D. Tenchine (CEA)
7.2	**10,15-10,40**	Pool thermal-hydraulics: integral approach	M. Tarantino (ENEA)
	10,40-11,05	**Coffee-break & Poster Session**	
7.3	**11,05-11,30**	Thermal-hydraulic analysis of ICE test section with DHR System	N. Forgione (UNIPI)
7.4	**11,30-11,55**	Pool-Experiment in ESCAPE facility	K. Van Tichelen (SCK-CEN)
7.5	**11,55-12,20**	HLM Fuel Bundle Analysis	I. Di Piazza (ENEA)
7.6	**12,20-12,45**	LMFR Instrumentations Development	S. Eckert (HZDR)
7.7	**12,45-13,10**	HLM Fuel Bundle Analysis (KALLA)	A. Batta (KIT)
	13,10-14,15	**Lunch (buffet) & Poster Session**	
7.8	**14,15-14,40**	CFD Application for HLM systems	F. Roelofs (NRG)
7.9	**14,40-15,05**	TH-System Code Applicability for LMFR	A. Del Nevo (ENEA)
7.10	**15,05-15,30**	V&V of CATHARE System Code modified for LMFR	M. Polidori (ENEA)
	SESSION 8	**SAFETY ASSESSMENT**	
8.1	**15,30-15,55**	LFR Safety Approach	E. Bubelis (KIT)
	15,55-16,20	**Coffee Break & Poster Session**	
8.2	**16,20-16,45**	Design Basis Accident Analysis	G. Bandini (ENEA)
8.3	**16,45-17,10**	Design Extended Condition	D. Pellini (KIT)
8.4	**17,10-17,35**	SGTR Assessment	A. Ciampichetti (ENEA)
8.5	**17,35-18,00**	HLM pool system: cover gas control	J. Neuhausen (PSI)
	18,00	**Adjourn**	

FRIDAY, APRIL 20TH, 2012

	SESSION 10	PH.D SESSION	Chair: W. Ambrosini
10.1	**9,00-9,25**	Natural Convection Heat Transfer in Thermally Stratified Liquid Metal	D. Martelli (UNIPI)
10.2	**9,25-9,50**	Compatibility of MYRRHA Candidate Structural Materials with Lead-bismuth Eutectic Environment: effect of strain rate and low dissolved oxygen concentration	G. Coen (SCK-CEN)
10.3	**9,50-10,15**	Fretting of Reactor Relevant Steels in Liquid Lead	M. Del Giacco (KIT)
10.4	**10,15-10,40**	Status of Development of a Full-core Multi-physics Code for the Modeling of Innovative Lead-cooled Nuclear Fast Reactors	R. Bonifetto (POLITO)
	10,40-11,05	**Coffee-break & Poster Session**	
10.5	**11,05-11,30**	Nano-crystalline Al2O3/a-Al2O3 Composite Coatings for Protection of Steels from Heavy Liquid Metal Corrosion: a Preliminary Study	F. Garcia Ferre (IIT-POLIMI)
10.6	**11,30-11,55**	Numerical Modeling of Oxygen Mass Transfer in Lead-Bismuth Eutectic Cooled System	A. Marino (SCK-CEN)
	SESSION 11	**PANEL SESSION**	Chair: C. Smith
	11,55-13,00	Conclusion and Common Discussion (All)	
	13,00-14,00	**Lunch (buffet)**	