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Materials for extreme thermal management PowerMat (WP17)

WP17 1st Workshop, Politecnico di Torino

Lorenzo Peroni (POLITO)

Task 3 description

Task 3: Dynamic testing and online monitoring

Testing of material samples in a broad range of environments:

- Mechanical testing in quasi-static and dynamic conditions, at various temperatures
- **Tests under very high power laser and particle beams**
- Irradiation tests with online monitoring of properties evolution
- Hydrodynamic simulations of experiments - constitutive models, spall strengths for new materials

Participants: CERN, ELI-NP, GSI, POLIMI, POLITO

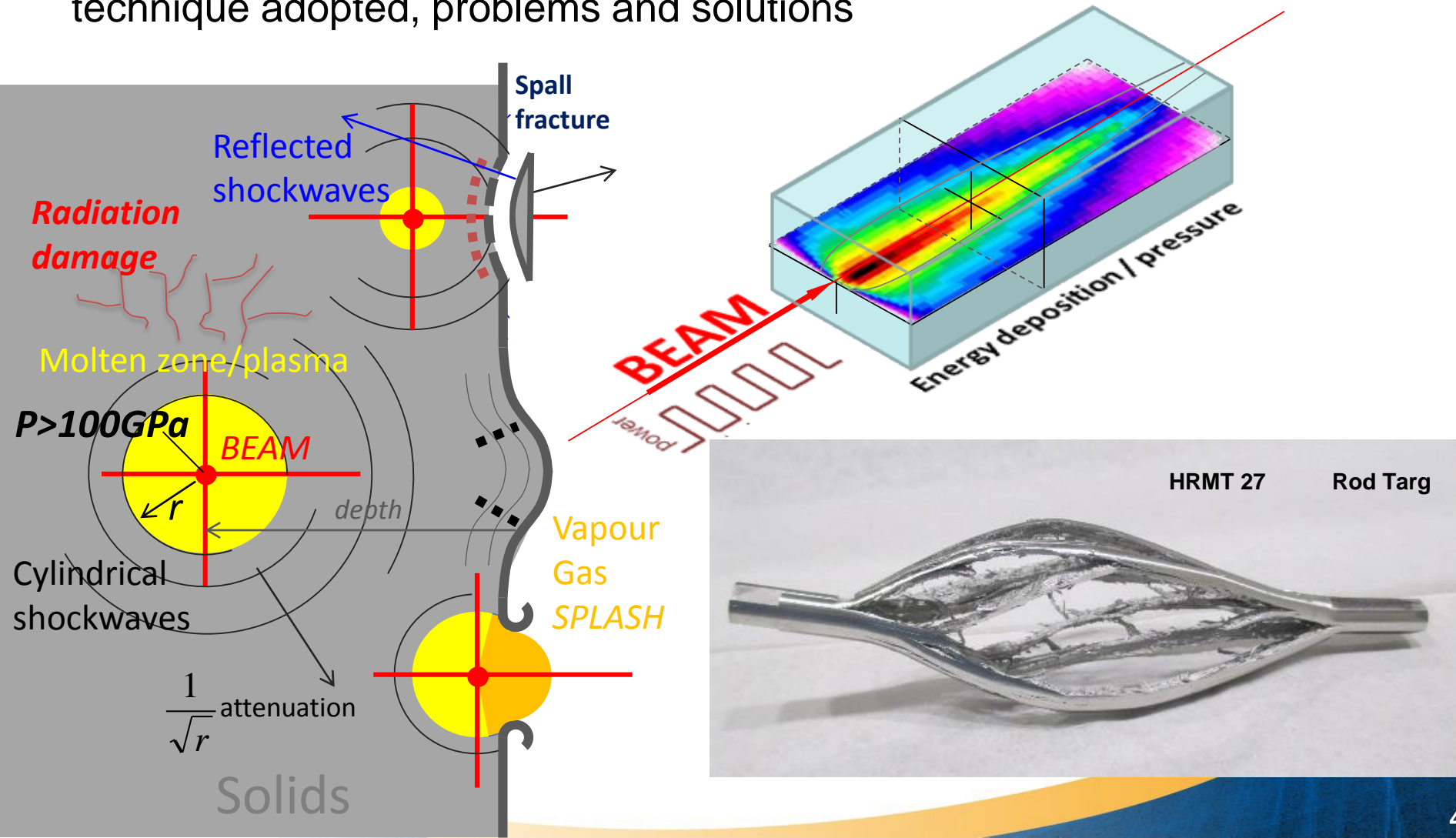
Milestones & Deliverables

Task	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
17.1		M														
17.2				D										M		
17.3									M			M				D
17.4														D		
17.5																M

- Task 17.3) Irradiation, with publication of report on web[month 27]
- Task 17.3) Irradiation effects analysis, with publication of report on web[month 36]
- Task 17.3) Irradiation test results: Beam impact on new material and composite [month 48]

Task 17.3 today

- An overview of the executed and planned HiRadMat experiments with particular reference to the materials under testing, methodologies and technique adopted, problems and solutions



HiRadMat in the past

2012

Exp-ID	Title	Description	Contact Person	Status	Beam Period	Mobile Table	Storage (temporary)
HRMT-09	LCOL	LHC collimator tests	A. Rossi - CERN	Completed	w32,2012	(Table-04)Table-04)	
HRMT-14	LCMAT	LHC collimator material R&D	A. Bertarelli - CERN	Completed	w39,w40-2012	Table-02	

2015

Exp-ID	Title	Description	Contact person	Status	Beam period	Mobile Table	Storage
HRMT 27	Rod Targ	Benchmarking AD Target	Marco CALVIANI	Completed	2015W45	(Table 08)	
HRMT 23	Jaws	Prototyping LHC Collimator Jaws	Alessandro BERTARELLI	Completed	2015W28	(Table 02)	

HiRadMat 2017

Exp-ID	Title	Description	Contact person	Status	Installation	Mobile Table	Storage
HRMT 35	TDICoat	Même expérience que TCDI avec matériaux différents à tester.	Inigo Lamas Garcia	Completed	2017W32	<u>Table 01 (CR002201)</u>	867-R-P58
HRMT38	Flex MAT	(with "Girafe")		postponed	2018	#Table 03#	
HRMT36	Multi Mat	Validation of Collimator Materials (JAWS 2)	Allessandro BERTARELLI	Approved	2017W40	<u>Table 02 (CR025436)</u>	TNC Table B
HRMT18	CRY2	Structural tests of bending Crystals	Simone MONTESANO - Anton LECHNER-Marco Calviani	Completed	2017W17 + W36	<u>Table 08 (CR002208)</u>	Cooldown stand 1
HRMT 21	RotColl	Validating the concept of a rotating collimator for MHC	Stefano Redealli	Completed	2017W29	<u>Table 04 (CR002204)</u>	Cooldown stand 2
HRMT 28	TCDI	Prototyping TCDI collimator of LHC	Francois Xavier NUIRY	Completed	2016W14 -> 2017W26	(Table 01)	
HRMT 37	SextSc	test es(with "Girafe")		Postponed	2018	#table 08#	
HRMT32	MicOpt2	testing optique microphone as beam loss monitor		Postponed	2018	Special support	TNC
HRMT41	Atlas Pixel			Completed	2017W32	<u>Table 03 (CR002203)</u>	876-R-017
HRMT42	TaScat		Claudio Loepoldo MARTIN	Completed	2017W17	(Table 08)	

HiRadMat 2018

Exp-ID	Title	Description	Contact person	Status	Beam	Mobile Table	Storage Table
HRMT 32	MicOpt	Measure performance of new radiation hard optical microphone	Daniel Deboy	Approved	2018 W??	<u>Special support</u>	TNC
HRMT 37	SextSc	Measure damage limit of superconducting magnets	Daniel Wollmann	Approved	2018 W34	#Table 08#	Cooldown stand 1
HRMT 38	Flex MAT	Test range of carbon material and target with intense proton beam	Marinela Tomut	Approved	2018 W36	#Table 03#	876-R-017
HRMT 47	Atlas PixRad	Estimate damage threshold of ATLAS inner detector & electronics	Antonio Sbrizzi	Approved	2018 W19	<u>Table 03 (CR002203)</u>	876-R-017
HRMT 48	PROTAD	Test Prototype for future antiproton production target	Claudio Torregrosa, Marco Calviani	Approved	2018 W21	#Table 04#	Cooldown stand 2
HRMT 46	Ntof-Target	Evaluate two different solution for n-ToF Target	Marco Calviani, Raffaele Esposito	Approved	2018 W23	#Table 08#	Cooldown stand 1
HRMT 45	TDIS-TZM	Validation test of TDIS jaw sub assembly	David Perez, Antonio Perillo-Marcone	Approved	2018 W30		
HRMT 44	TCDIL-DEEP	Test 2 designs of TCDIL collimator jaw	Francois-Xavier Nuiry	Approved	2018 W28	#Table 01#	867-R-P58
HRMT 43	BeGrid 2	Test Thermal shock response of conventional and novel materials	Marco Calviani	Approved	2018 W41	#Table 03#	876-R-017
HRMT 19	BLM2	Verification of ionization chamber	Slava Grishin	Approved	2018 W??	<u>Special support</u>	TNC

Task 17.3 today

14:00	Task 17.3 - Objectives of Task 17.3	PERONI, Lorenzo
14:10	Task 17.3 - Multimat experiment	PASQUALI, Michele
14:40	Task 17.3 - Dynamic characterization: first findings from Multimat experiment	FICHERA, Claudio
15:00	Task 17.3 - Measurement technique in HiRadMat experiments: requirements and solutions	GUINCHARD, Michael
15:20	Task 17.3 - Collaborative efforts at GSI on irradiation and thermo-mechanical dynamic testing experiments	TOMUT, Marilena
15:40	Coffee Break	
15:50	STI HRMT27 + HRMT42 + future PROTAD and nTOF experiments	TORREGROSA MARTIN, Claudio Leopoldo
16:10	STI HRMT-28, HRMT-35 and future Deep Impact experiment	NUIRY, Francois-Xavier
16:30	Towards proton acceleration with 1 PW beams at ELI-NP	ASAVEI, Theodor
16:45	Task 17.3 - Discussion on task objectives, actions and deliverables	



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Thank you!