Experiments for the 2014 MST1 program

BLOCK 1 – SCENARIO & CONFINEMENT

EXP. ID	EXPERIMENT TITLE	DIRECTLY RELATED PROPOSALS[1]	SUPPORTING PROPOSALS[1]	LINKED TO EXP	DELIVERABLES	SHOTS
HEADLINE 1.1: Increase the margin to achieve high fusion gain on ITER						
AUG14-1.1-1	**Integrated baseline scenario at low and high triangularity at q95=3 and 3.6**	H1.1_AUG_38 H1.1_AUG_8 H1.1_AUG_13 H1.2_AUG_7	H1.1_AUG_26 H1.1_AUG_44	AUG14-1.2-1	1. Establish scenario with both low and high delta at q95=3 (β_N ~1.8, f_{GW}~0.8, H98 ~1) ensuring good core, pedestal, SOL and ELM diagnostic coverage (with Raus scan) 2. On the previous scenario vary β_N from 1.6 to 2.2 3. Establish alternative q95=3.6 scenario (β_N ~2.2, f_{GW}~-0.9-0.95, H98 ~1.2) at low and high delta ensuring good core, pedestal, SOL and ELM diagnostic coverage. 4. Maximise ICRH power for ITER relevance and W handling 5. Test impact of N2 seeding on confinement in selected plasmas 6. Test impact of ELM coils and pellet pace making on ELMs in selected plasmas 7. Investigate the pedestal structure, height, fluctuation and evolution in all these plasmas 8. Modelling activity: (a) pedestal stability analysis for selected cases throughout the ELM cycle and comparison to EPED. (b) Transport (e.g. TRANSP) and non-linear gyrokinetic (e.g. GENE) analysis for the plasma core and pedestal. (c) SOL modelling to study the neutral penetration and fuelling efficiency. (d) Bootstrap current.	36
AUG14-1.1-2	**Integrated improved H-mode scenario with low and high radiative fraction in Deuterium and Hydrogen**	H1.1_AUG_5 H1.1_AUG_11 H1.1_AUG_14 H1.1_AUG_12 H1.6_AUG_2	H1.1_AUG_26 H1.1_AUG_44 H1.2_AUG_15	AUG14-2.1-1	1. Establish scenario with both low and high delta shape at q95~4.5 ensuring good core, pedestal SOL and ELM diagnostic coverage (with Raus scans) 2. Establish un-seeded reference hybrid plasma (β_N ~2.25, fGW~0.6, H98 >1) and perform power scan with varying β_N = 1.5-2.25-3.0 (with beta control) 3. Test different edge radiator impurities (N2, CD4, Ne, He) in the same beta control scan 4. Include core radiators Ar or Kr with and without preferred edge radiator (prob. N2) to approach higher Frad and repeat β_N control scan 5. Investigate the pedestal structure, height, fluctuation and evolution in all these plasmas 6. Confinement comparison in selected plasmas in D and H 7. Modelling activity: (a) pedestal stability analysis for selected cases throughout the ELM cycle and comparison to EPED. (b) Transport (e.g. TRANSP) and non-linear gyrokinetic (e.g. GENE) analysis for the plasma core and pedestal. (c) SOL modelling to study the neutral penetration and fuelling efficiency. (d) Bootstrap current.	44
AUG14-1.1-3	**Dimensionless ρ* and β scaling of confinement and turbulence in standard and improved H-mode**	H1.1_AUG_4 H1.1_AUG_37 H1.1_AUG_18 H1.1_AUG_25	H1.1_AUG_44		1. Document the β dependence of transport and confinement time for the improved H-mode scenario in the high beta range of β_N ~2.5-3.0 2. Assess the degree of similarity between AUG 'improved H-mode' and JET 'hybrid' scenario with ILW 3. Determine the ρ* dependence of the confinement in a current scan and with a H/D isotope scan 4. Measure the spatial structure of turbulence in these scans using the coupled IPP and LPP Doppler reflectometers 5. Modelling activity: (a) core and pedestal turbulence. (b) Transport (c) Stability. (d) ECRH (e.g.TORBEAM . (e) heat transport (e.g. ASTRA) (f) microturbulence (e.g GENE)	28
AUG14-1.1-4	**Momentum and particle transport. Scaling intrinsic rotation and role of sawteeth on momentum and particle transport**	H1.1_AUG_30 H1.1_AUG_36 H1.1_AUG_43 H1.1_AUG_7 H1.1_AUG_27 H1.2_AUG_8			1. Provide date multi-machine ρ* scaling of intrinsic torque in order to extrapolate the intrinsic torque and consequent intrinsic rotation to ITER. 2. Measurement of intrinsic rotation during ITG to TEM transition and simultaneously of core micro-turbulence 3. Determine transport properties of thermal helium (helium "ash") in different turbulence regimes and collisionalities 4. Determine the role of sawteeth on momentum and thermal helium transport 5. Modelling activities: (a) analysis of the NBI torque (e.g. TRANSP). (b) Gyrokinetic simulations of the turbulence (e.g. GENE) and comparison between the simulated and measured intrinsic torque. (c) Modelling of the torque induced by fast ion losses in RMP experiment (e.g. ASCOT) (d) Modelling of particle and momentum transport due to the sawtooth cycle	28
AUG14-1.1-5	**ITER-like heating scheme in improved H-modes**	H1.1_AUG_22			1. Establish improved H-mode scenario with NBI, ICRH and ECRH to obtain the relevant ITER-like heating mix and νei*τE. 2. Modify the scenario using central ctr-ECCD to check effects of sawtooth stabilization 3. Modelling activities: core transport modelling (e.g. TRANSP, TGLF..), benchmark against ITER H-mode modelling .	8
AUG14-1.1-6	**Energy losses near H-mode density limit**	H1.1_AUG_1			1. Quantify the energy losses during H-mode density limit (HDL). 2. Improve configuration for optimum core, pedestal, SOL and ELM diagnostic coverage 3. Determine the contribution of radial transport by filaments in the SOL 4. Determine the role of triangularity 5. Modelling activities: (a) power balance estimates (b) transport analysis of the RCP measurements. (c) Pedestal stability throughout the H-L transition	8
AUG14-1.1-7	**Bulk ion heating with 3He minority heating on AUG**	H1.1_AUG_34			1. Establish 3He minority heating as a scheme to heat bulk ions with no net toroidal torque on AUG. 2. Compare ICRF modelling codes for an ICRF scheme with direct relevance to ITER.	6
HEADLINE 1.6: Determine optimum particle throughput for reactor scenarios						
AUG14-1.6-1	**Pellet fuelling to high density and in RMP plasmas**	H1.6_AUG_3 H1.6_AUG_4	H1.6_AUG_6 H1.6_AUG_7 H1.6_AUG_11	AUG14-1.2-4 AUG14-1.2.-6 AUG14-1.2-7	1. Establish plasma H-mode plasmas fuelled by shallow HFS pellets and with ELMs mitigated by RMP fields. 2. Establish an operational scenario for high densities (n/ngw~1.5) keeping good confinement H_{98}~1 3. Optimise discharge for good diagnosis of the pellet cloud, penetration depth and the pellet plasmas-cooling effect and compare results to other MST1 devices. 4. Modelling activities: (a) transport modelling (e.g.). (b) Pellet ablation and drift modelling (c) HPI2 pellet deposition model (d) Validation of post-particle transport	12
AUG14-1.6-2	**Collisionality dependence of particle transport**	H1.6_AUG_8			1. Assess the dependence of the convective and conductive particle transport contribution on collisionality 2. Answer requests of the ITPA Joint Experiment TC-15. 3. Modelling activities: (a) Integrated Data Analysis of density data. (b) Particle transport (e.g. ATSRA). (c) turbulence nature and related transport (e.g. GS2)	8
AUG14-1.6-3	**Geometry effects on particle exhaust and gas flow studies *(during tech run day)***	H1.6_AUG_10			1. Investigation of geometry effects on particle exhaust and gas flow studies on the ASDEX-Upgrade Divertor III 2. Modelling activity: 2D/3D- Direct Simulation Monte Carlo (DSMC). B2-EIRENE modelling in the Divertor III region for the proposed plasma discharges. And study the comparison of DSMC and B2-EIRENE modelling	0

[1] see http://users.jet.efda.org/iterphysicswiki/index.php/2014_WPMST1:_AUG_experiment_proposals_submission

BLOCK 2 – MHD & CONTROL

EXP. ID	EXPERIMENT TITLE	DIRECTLY RELATED PROPOSALS[2]	SUPPORTING PROPOSALS[2]	LINKED TO EXP.	DELIVERABLES	SHOTS
HEADLINE 1.2: Operation with reduced or suppressed ELMs						
AUG14-1.2-1	**Comparison of pedestal evolution in deuterium and hydrogen plasmas**	H1.1_AUG_6 H1.1_AUG_13 H1.1_AUG_40 H1.2_AUG_4 H1.2_AUG_14 H1.2_AUG_15 H1.2_AUG_16 H1.2_AUG_27		AUG14-1.1-1	1. Starting from the ITER baseline scenario investigate the changes in the pedestal structure, evolution and stability in type-I ELMy H-modes with β_{pol}, triangularity and ρ^* by measuring key profiles including T_e, T_i, E_r, and n_e and compare the pedestal evolution in similar Deuterium and Hydrogen discharges . 2. Measure density and temperature fluctuations in the pedestal and identify possible ELM precursors and compare the results to data from other MST1 devices. 3. Use new diagnostic capabilities to assess poloidal impurity asymmetries, j-profile and E_r in the inter-ELM phase as well as the L-H transition. 4. Modelling activities: (a) Compare the pedestal evolution and stability to current pedestal models; (b) Compare fluctuation measured characteristics at the pedestal top on different MST devices to gyro-kinetic modelling ;(c)develop new models if needed.	16
AUG14-1.2-2	**Effect of divertor geometry on the L-H transition**	H1.1 _AUG_15 H1.2_ AUG_16			1. Determine the impact of the X-point location in the L-H threshold using divertor configurations with the outer strike point on the horizontal target. 2. Assess the effect of different plasma densities close to the minimum power threshold in these configurations with different X-point location. 3. Assess changes in the edge and SOL parameters for the configurations with different X-point location 4. Modelling activities: compare changes in the edge and SOL parameters for the configurations with different X-point location to model predictions.	10
AUG14-1.2-3	**I-phase physics in Hydrogen and Deuterium**	H1.1_AUG_41 H1.2_AUG_28	H1.2_AUG_21 H1.2_AUG_10		1. Determine the isotope dependence of the interplay between velocity fluctuations and turbulence suppression during the I-phase for different edge collisionalities. 2. Modelling activity: (a) Compare the results with leading theoretical models of turbulence suppression by sheared turbulence driven flows.	6
AUG14-1.2-4	**ELM mitigation/suppression studies using magnetic perturbations at low collisionality**	H1.2_AUG_3 H1.2_AUG_5 H1.2_AUG_6 H1.2_AUG_16 H1.2_AUG_17 H1.2_AUG_22 H1.2_AUG_23 H1.2_AUG_25 H1.2_AUG_27 H1.2_AUG_29 H1.4_AUG_16			1. Understand the differences between the effect of n=2 resonant magnetic perturbations at low pedestal collisionality ($\nu^*ped \leq 0.5$) in ASDEX Upgrade, MAST and (optionally) DIII-D) 2. Uses slowly rotating magnetic perturbation fields to better diagnose the effects of magnetic perturbation on the pedestal and the SOL and compare to modelling. 3. Characterise effects of RMPs on target heat flux, core performance and L-H transitions in AUG with n=2 and compare to MAST data with n=2,3,4,6.. 4. Modelling activity: (a) effects of magnetic perturbation on the pedestal and the SOL. (b) Edge stability including the 3D effects.	33
AUG14-1.2-5	**L-mode plasma response to magnetic perturbations at low density**	H1.2_AUG_2 H1.2_AUG_16 2.2_AUG_18	H2.2_AUG_19		1. Quantify the 3D structure of Er and the associated turbulence in the plasma edge and SOL at low density in L-mode and through slow L-H transitions. 2. Modelling activity: (a) validation of 3D field penetration models including plasma screening.	6
AUG14-1.2-6	**ELM mitigation/suppression susing magnetic perturbations at high density**	H1.2_AUG_9 H1.2_AUG_18 H1.2_AUG_19			1. Determine the character of the small ELMs due to n=2 magnetic perturbations at high density up to high heating power (P_{NBI} > 12.5 MW). 2. Improve the understanding of the density response to magnetic perturbations at high and medium densities 3. Compare the ELM characteristics to MAST mitigated ELMs with n=2,3,4,6 resonant perturbations. 4. Modelling activity: (a) density response to magnetic perturbations (b) Edge stability including the 3D effects.	8
AUG14-1.2-7	**ELM mitigation using pellet injection**	H1.2_AUG_7 H1.2_AUG_11 H1.2_AUG_12 H1.6_AUG_3 H1.6_AUG_11		AUG14-1.2-1 AUG14-1.6-1	1. Assess the maximum pellet frequency for ELM mitigation at different pedestal conditions in D using the scans performed under AUG14-1.2-1. 2. Assess ELM mitigation requirements with pellets during the current ramp-up with changing q_{95}. 3. Assess the effect of magnetic perturbations on ELM mitigation with pellets. 4. Modelling activity: (a) Validate pellet ablation models in particular in the presence of 3D perturbations.	16
HEADLINE 1.4: Integration of MHD control into plasma scenarios						
AUG14-1.4-1	**Develop active sawtooth control using ECCD and RMPs**	H1.4_AUG_5 H1.4_AUG_17 H1.2_AUG_29		AUG14-1.8-2	1. Investigate methods for sawtooth destabilisation and develop active real time control techniques. 2. Extend previous studies to higher β_N > 2.5. 3. Modelling activity: (a) validate existing sawtooth stability models; (b) sawtooth control; (c) 3D MHD and RMP	10
AUG14-1.4-2	**NTM control using ECCD**	H1.4_AUG_2 H1.4_AUG_3 H1.4_AUG_21		AUG14-1.8-2	1. Optimise the ECCD deposition and power for 3/2 NTM stabilisation and extend to high β_N > 2. 2. Optimise the equilibrium reconstruction for pre-emptive ECCD injection for 3/2 NTM stabilisation using the RAPTOR code 3. Test inline ECE detection for ECCD deposition optimisation. 4. Modelling activity: (a) NTM real-time control (b) integrated controller. (c) model of the dynamics of the feedback loop.	24
AUG14-1.4-3	**NTM onset mechanisms at low rotation without triggers**	H1.4_AUG_7			1. Understand the role of plasma rotation and polarisation current for NTM stability with core ECRH by comparing ASDEX Upgrade to TCV results. 2. Modelling activity: (a) Validate current NTM stability and NTV models and develop new models if required.	4
AUG14-1.4-4	**NTM dynamics and external magnetic perturbations**	H1.4_AUG_11 H1.4_AUG_15	H1.4_AUG_1 H1.4_AUG_12	AUG14-1.2-4 AUG14-1.2-5	1. Improve the understanding of the interaction of NTMs with magnetic perturbations by their interaction with magnetic perturbations. 2. Study the NTM onset mechanism in NTM free discharges using rotating n=1 magnetic perturbations. 3. Modelling activity: (a) Validate existing NTM onset and saturation models and develop new models where necessary	16
AUG14-1.4-5	**β-limit with conducting structures**	H1.4_AUG_4 H1.4_AUG_18 H1.4_AUG_20			1. Probe stability limits with resonant field amplification in discharges above the ideal stability limit and extend the operation to higher β_N 2. Assess the need and efficiency of the different stabilizing methods (plasma rotation or active feedback) 3. Investigate the use of a frequency-dependent compensation scheme for magnetic sensors available either offline and in real-time to estimate the plasma response. 4. Modelling activity: (a) mode dynamics close to the ideal mode limit. (b) Implement and validation of fully 3D time dependent description of external magnetic fields generated by external coils under realistic wall geometries and actuators (e.g. CARIDDI, CAFE, CarMa, STARWALL). (c) 3D effects induced in closed loop control by discretization of inputs and actuators	8
HEADLINE 1.7: Optimise fast ion confinement and current drive						
AUG14-1.7-1	**Neutral beam current drive**	H1.7_AUG_16 H1.7_AUG_23	H1.7_AUG_3		1. Assessment of on- and off-axis NBCD efficiency and its dependence on E/Te. 2. Characterization of fast-ion distribution with multiple diagnostics (FIDA, CTS, NPA) in relation to NBCD (MSE), assessment of possible anomalous fast-ion transport. 3. Modelling activity: (a) Validation of transport modelling. (b) first-principles turbulent transport modelling of fast-ion transport	16
AUG14-1.7-2	**Effect of Alfvén instabilities on fast ions**	H1.7_AUG_11 H1.7_AUG_6	H1.7_AUG_13 H1.7_AUG_9 H1.7_AUG_14		1. Characterization of fast-ion redistribution by AE, in physical and velocity space, and particularly scaling with AE amplitude, using CTS, FIDA, NPA. If possible by using ramp-up phase, characterization of frequency-chirping AE and relation with fast ions., and compare AUG results to existing data from other MST1 devices 2. Initial test of ECCD role in affecting AE mode stability	8

[2] see http://users.jet.efda.org/iterphysicswiki/index.php/2014_WPMST1:_AUG_experiment_proposals_submission

			H1.7_AUG_1		3. Modelling activity: (a) Alfven Eigenmodes effect on fast ion transport (b) Effect of ECCD on AE stability	
AUG14-1.7-3	**Effect of sawteeth on fast ions**	H1.7_AUG_4 H1.7_AUG_17	H1.7_AUG_19		1. Characterization of fast-ion redistribution by sawtooth crashes, in different regions of velocity space and as a function of the sawtooth period and inversion radius, using CTS, FIDA, FILD, NPA, and compare AUG results to existing data from other MST1 devices 2. Modelling activity: (a) Assessment of effect of sawteeth on NBCD efficiency. (b) Validation of models of sawtooth-crash-induced fast-ion transport.	8
AUG14-1.7-4	**Combined effect of ELMs and magnetic perturbation on fast ions**	H1.7_AUG_25	H1.7_AUG_12		1. Assessment of variation of fast-ion losses in the presence of MPs with different types of ELMs, and of parametric dependence of these losses on density and collisionality. 2. Modelling activity: (a) Development and Validation of modelling of fast-ion losses in perturbed magnetic fields	8
HEADLINE1.8: Develop integrated scenarios with controllers						
AUG14-1.8-1	**The O1 heating scheme for ITER**	H1.8_AUG_4 H1.8_AUG_6			1. Find the stray radiation minimum for O1 heating in feed-forward mode. 2. Characterize O1 heating efficiency and location (including O1 and UH layers) using ECE. 3. Modelling activity Comparison of experimental and calculated optimal polarizer angles for O1 heating.	8
AUG14-1.8-2	**Model-based real-time plasma profile reconstruction and prediction**	H1.8_AUG_3		AUG14-1.4-1 AUG14-1.4.2	1. Validate real-time RAPTOR reconstructions against offline analysis. Integrate equilibrium reconstruction (using also j profile), MHD physics in RAPTOR. 2. Demonstrate real-time application of RAPTOR.	3
AUG14-1.8-3	**Plasma position control by reflectometry**	H1.8_AUG_2			1. Demonstrate position control using HFS and LFS O-mode reflectometers simultaneously. Document control scenario. 2. Test L-H transition detection algorithm for density scaling adaptation.	5

BLOCK 3 - DIVERTOR/SOL, PWI AND DISRUPTION MITIGATION/AVOIDANCE

EXP. ID	EXPERIMENT TITLE	DIRECTLY RELATED PROPOSALS[3]	SUPPORTING PROPOSALS[3]	LINKED TO EXP.	DELIVERABLES	SHOTS
HEADLINE 1.3: Avoidance and mitigation of disruption and runaways electrons						
AUG14-1.3-1	**Disruption Avoidance**	H1.3_AUG_4 H1.3_AUG_5 H1.4_AUG_9 H1.3_AUG_7 H1.3_AUG_6	H1.3_AUG_3 H1.3_AUG_9 H1.3_AUG_10 H1.3_AUG_11	AUG14-1.4-2	1. Develop real-time predictors methods optimised in term of model training, success rate, anticipation time, differentiation among different types of disruptions 2. Avoidance of disruption by active means (ECRH/ECCD) 3. Modelling activity: (a) Ray-Tracing at high density (b) Self-Consistent Treatment of Rutherford Equation	16
AUG14-1.3-2	**Disruption mitigation**	H1.3_AUG_1 H1.3_AUG_2 H1.3_AUG_8			1. Assessment of Massive Gas Injection limits as a mitigation method for heat loads and forces 2. Document conditions for run-away electron generation and mitigation 3. Modelling activity: (a) 3D non linear MHD. (b) Bolometric Deconvolution (c) transport in multi-component plasma (e.g TOKES)	20
HEADLINE 1.5: Control of core contamination and dilution from W PFCs						
AUG14-1.5-1	**W asymmetries**	H1.5_AUG_4 H1.5_AUG_7	1.5_AUG_6		1. Understand transport physics with the goal to demonstrate acceptable W concentration in H-mode and extrapolate to ITER/DEMO 2. Modelling activity: W behaviour (e.g. GKW, NEO, TORIC-SSPQL)	16
AUG14-1.5-2	**Characterisation of ICRF related sheath and coupling effects**	H1.1_AUG_10 H1.5_AUG_1 H1.5_AUG_2			1. Minimise heavy impurity sputtering and local heat loads by optimisation of plasma edge 2. Minimisation of ICRF sheaths effects by modifications of ICRF antenna parameters an d validation of ICRF sheaths models 3. Develop gas puff technique and related modelling to maximise ICRF power in H-mode independently of the edge conditions 4. Modelling activity: (a) SOL (e.g. SOLPS), (b) edge physics (e.g. EIRENE)	22
AUG14-1.5-3	**W transport and its accumulation in presence of MHD instabilities in H-mode plasmas**	H1.5_AUG_3			1. Assess W transport in the plasma core in connection with MHD instabilities. 2. Mitigation of high-Z peaking 3. Develop high-Z accumulation avoidance by means of central electron heating 4. Modelling activity: transport, impurity, MHD (e.g. STRAHL, EUTERPE, XTOR-2F)	8
HEADLINE 2.1: Detachment control for the ITER and DEMO baseline strategy						
AUG14-2.1-1	**High radiation scenarios β_N**	H2.1_AUG_1 H2.1_AUG_2 H2.1_AUG_4 H1.6_AUG_12		AUG14-1.1-2	1. Optimize impurity mix for divertor/SOL and main chamber radiation 2. Document detailed conditions to reach detachment at highest available power flowing through the separatrix 3. Quantify particle and power loads to the main chamber 4. Modelling activity: (a) transport (e.g. Transp, STRAHL) (b) Radiation Deconvolution (Bolometry) (c) edge/SOL (e.g. SOLPS)	22
AUG14-2.1-2	**H-Mode Detachment studies (HFS blob)**	H2.1_AUG_6 H2.1_AUG_3 H2.1_AUG_7 H2.1_AUG_5			1. Understand physics of detachment and influence of HFS blob 2. Understand fuelling limit at high densities 3. Modelling activity: (a) Bolometric Deconvolution (b) edge/SOL (e.g. SOLPS) (c) Onion Skin Model	20
HEADLINE 2.2: Prepare efficient PFC operation for ITER and DEMO						
AUG14-2.2-1	**Power handling capabilities of castellated tungsten divertor**	H2.2_AUG_12 H2.2_AUG_11 H2.2_AUG_24			1. Minimisation of divertor and main chamber erosion 2. Quantify heat loads on castellated solid W divertor & solid W divertor as reference 3. Modelling activity: (a) 3D Heat Flux (e.g ABACUS, MEMOS), (b) edge transport (e.g.EMC3-Eirene)	16
AUG14-2.2-2	**Migration studies**	H2.2_AUG_1 H2.2_AUG_3 H2.2_AUG_9 H2.2_AUG_10 H1.5_AUG_8	H2.2_AUG_2		1. Validate codes on plasma wall interactions (erosion, re-deposition and migration) 2. Minimisation of divertor and main chamber erosion and extrapolation to ITER/Demo 3. Modelling activity: edge, PWI, SOL, divertor (e.g. SOLPS, ERO, DIVIMP, WALLDYN)	14
AUG14-2.2-3	**SOL filamentary transport at high density**	H1.1_AUG_31 H2.2_AUG_8 H2.2_AUG_13 H2.2_AUG_15 H2.2_AUG_16 H2.2_AUG_21 H2.2_AUG_22	H2.2_AUG_17 H2.2_AUG_18	AUG14-2.3-1	1. Quantify (and try to extrapolate) main chamber filamentary transport (expected particle flux and energy) 2. Document detailed conditions to reach detachment 3. Modelling activity: turbulence and transport (e.g. GEMR)	20
AUG14-2.2-4	**Ion Cyclotron Wall Conditioning *(during tech run day)***	H2.2_AUG_4			1. Develop Ion Cyclotron Wall Conditioning techniques (to be done on technical day) 2. Modelling activity: e.f RFdinity1D (1D Monte Carlo code)	0
HEADLINE 2.3: Optimise predictive models for ITER and DEMO divertor/SOL						
AUG14-2.3-1	**L-mode detachment and power load**	H2.3_AUG_1 H2.1_AUG_6 H2.3_AUG_4 H2.3_AUG_9	H2.3_AUG_6 H2.3_AUG_3	AUG14-2.2-3	1. Code validation for simple L-Mode cases in all metal (C-free) devices experiments 2. Power load broadening (S-factor) 3. Modelling activity: (a) edge/SOL (e.g SOLPS), (b) Bolometric Deconvolution, (c) Stark Broadening Modelling	18

[3] see http://users.jet.efda.org/iterphysicswiki/index.php/2014_WPMST1:_AUG_experiment_proposals_submission

Tasks for the 2014 MST1 program

TASK ID	TASK TITLE	DELIVERABLES
T14-1	**Coordination of core transport modelling**	1. Coordination of the modelling support in the area of core transport and data analysis for the MST1 scientific program 2. Support for core transport modelling for the MST1 scientific program 3. Verification that the relevant data are taken during the experiments to allow modelling of the data with codes. 4. Organization of core transport modelling meetings for the MST1 scientific program and liaison with modelling activities in the EU.
T14-2	**Coordination of modelling of ELMs and pedestal**	1. Coordination of the modelling support in the area of ELM and pedestal and data analysis for the MST1 scientific program 2. Support for ELM and pedestal modelling for the MST1 scientific program 3. Verification that the relevant data are taken during the experiments to allow modelling of the data with codes. 4. Organization of core transport modelling meetings for the MST1 scientific program and liaison with modelling activities in the EU.
T14-3	**Coordination of edge and SOL modelling**	1. Coordination of the modelling support in the area of edge and SOL and data analysis for the MST1 scientific program 2. Support for edge and SOL modelling for the MST1 scientific program 3. Verification that the relevant data are taken during the experiments to allow modelling of the data with codes. 4. Organization of ELM and pedestal modelling meetings for the MST1 scientific program and liaison with modelling activities in the EU.
T14-4	**Coordination of modelling on MHD stability and its control**	1. Coordination of the modelling support in the area of 3D MHD and its control and data analysis for the MST1 scientific program 2. Support for MHD and its control modelling for the MST1 scientific program 3. Verification that the relevant data are taken during the experiments to allow modelling of the data with codes. 4. Organization of MHD/control modelling meetings for the MST1 scientific program and liaison with modelling activities in the EU.
T14-5	**Coordination of fast ion modelling (stability and transport)**	1. Coordination of the modelling support in the area of fast ion physics and data analysis for the MST1 scientific program 2. Develop integrated modelling of fast ion instabilities and their effect on the fast ion distribution including changes to the equilibrium. 3. Compare the modelling to existing data on all MST1 devices (AUG, MAST and TCV). 4. Support for fast ion modelling of the MST1 experiments. 5. Ensuring that relevant data are taken during the experiments to allow modelling with codes. 6. Organization of fast ion physics modelling meetings for the MST1 scientific program and liaison with modelling activities in the EU.
T14-6	**Improve integrated plasma control in preparation of operation with advanced divertor configurations.**	**Headline 1.8** 1. Develop integrated control algorithms for future operation of MST1 tokamaks based on existing MST1 tokamaks (AUG, TCV, MAST) data. 2. Assess the optimal sensor position for advanced magnetic divertor and shape control.
T14-7	**Assessment of integrated control experiments in TCV 2011-2013 campaigns and development of algorithms and scenarios for post-2014 TCV-Upgrade campaigns**	**Headline 1.8** 1. Analysis, modelling and documentation of 2011-2013 TCV data from control experiments, including the components of profile control, real-time modelling (RAPTOR), shape control, breakdown control, density control, NTM and sawtooth control, inductance and current control 2. Streamlining and integration of discharge-preparation and real-time control software in preparation of TCV-Upgrade campaigns 3. Development of control algorithms and scenarios to a level compatible with the needs of the MST program for 2015, in particular making routine use of real-time equilibrium reconstruction (prototype at the moment)
T14-8	**Comparison of the relationship between upstream filament size to target λ_q with codes on MAST**	**Headline 2.2** 1. Compare empirically the upstream filament size and SOL decay length with target measurements of λ_q on MAST over a wide variety of discharge conditions. 2. Investigate theoretically (e.g. with BOUT++, TOKAM-X) the effect of the X-point on the SOL turbulence propagation to the target and project to the upgraded divertor with extended divertor leg in the MAST Upgrade.
T14-9	**Analysis and modelling of snowflake divertor studies and advanced-shape H-mode experiments in TCV 2011-2013 campaigns and preparation of 2015 campaign and beyond on TCV-Upgrade**	**Headline 2.4** 1. Analysis, modelling and documentation of 2011-2013 TCV data from snowflake and advanced divertor studies (especially sigma scans in L- and H-mode, radiative divertor experiments, blob propagation) 2. Analysis, modelling and documentation of 2011-2013 TCV data from H-mode experiments in advanced configurations (negative triangularity, high-power X3 scenarios towards quiescent ELM-free regime) 3. Delivery of tool set for advanced shape experiments in post-2014 TCV-Upgrade campaign (optimized diagnostics, control algorithms including shape control) and detailed offline scenario preparation for efficient and safe execution of key scenarios (including shapes with divertor strike point on low-field-side wall) 4. Demonstration of successful operation in snowflake and H-mode scenarios in TCV after the vacuum chamber upgrade to add the NBI ports (commissioning campaign at the end of 2014).
T14-10	**Study the effect of the X-point topology on the target heat flux in preparation to operation with advanced divertor configuration.**	**Headline 2.4** 1. Using data from all MST1 devices (AUG, MAST and TCV), determine how mid-plane cross field transport maps to the target in configurations with one or more X-points (e.g. Snow Flake). 2. Compare experimental data to turbulence and fluid modelling and develop new models if needed. 4. Identifying a figure of merit to compare the conventional to alternative divertor concepts (in order to reduce the peak heat load with acceptable loss of confinement)