Proposal Details

Reference No.	CfP-FSD-AWP26-TM-07-MPG-02	**Research Unit**	MPG
Work Package	Theory & Modelling	**Proponent**	Tobias Görler
Status	Change requested		

Title TSVV-A: H-Mode and Small/No-ELM Pedestals

Description / Abstract

This proposal addresses one of the most pressing issues in fusion research: characterising the plasma edge transport for the optimisation of future devices, and developing the ability to model and predict the L-H transition and its various characteristics. These deliverables are suggested to be met in the context of a multi-fidelity approach, ranging from gyrokinetic (GK) models to real-time capable reduced models. Building on experience gained in the 2021–2025 phase, we will apply the findings to new, challenging GK edge and pedestal characterisation studies, albeit with a more focused target of small-ELM/no-ELM regimes and their transfer to future devices in mind. Particular emphasis will be given to the interplay with electromagnetic modes and cross-scale coupling with fine-scale electron temperature gradient (ETG) turbulence and resonant-magnetic-perturbations, for instance.
In close collaboration with TSVV-C and, to a certain extent, TSVV-B, several turbulence studies will extend beyond the separatrix. Based on the current state of the art, L-H transition-type behaviour is expected when varying the input power in corresponding flux-driven setups. During the project, these studies will be refined using new physics capabilities, such as improved neutral and sheath models, as well as considering parallel magnetic fluctuations and sub-ion-scale effects. Despite the high-fidelity simulation campaigns, a multifaceted work plan has been developed to address the community's need for faster, reduced models for reactor design and optimisation. Based on active discussions with TSVV-11 (TSVV-H in future), we will use recently developed IMAS interfaces to routinely perform GENE/TGLF comparisons for the scenarios in question, thereby assisting TSVV-H with assessments of one of their main reduced turbulence models. We will also aim for studying and refining L-H transition-type behaviour with reduced models. Another effort will focus on developing or extending specific reduced models for ETG and electromagnetic modes, which were confirmed as relevant edge modes in the previous project phase, for which the team has comprehensive experience. Finally, the fluid component will be used to develop scalings for easier access to and comparison with experimental results, which is considerably faster than full GK modelling, and could be used for point-wise comparison and assessment. The proposal takes advantage of including groups from across Europe that are known for their leading role in GK, fluid, and reduced modelling for all of these activities. A detailed work plan, team description and risk assessment are provided in the full proposal.

Proposed Resources: CfP-FSD-AWP26-TM-07-MPG-02-1

Proposed Manpower

Year	Subcategory	Name	Description	PMs
2026	PM 50% standard	Görler Tobias (MPG)		6.0
		Balestri Alessandro (EPFL)		3.0

Year	Subcategory	Name	Description	PMs
		Becoulet Marina (CEA)		4.0
		De Lucca Brenno (EPFL)		3.0
		Dicorato Mattia (MPG)		4.0
		Dif-Pradalier Guilhem (CEA)		4.0
		Donnel Peter (CEA)		4.0
		Jitsuk Taweesak (DIFFER)		3.0
		LoCascio Guillaume (MPG)		3.0
		Mariani Alberto (02-CNR)		4.0
		Pueschel M.J. (DIFFER)		5.0
		Sarazin Yanick (CEA)		2.0
		Sheffield Heit Facundo (MPG)		4.0
		Ulbl Philipp (MPG)		6.0
		Zhang Haoran (EPFL)		5.0
		SUBTOTAL:	*Total Manpower [PMs]*	60.0
			Total Costs [k€]	639.750
2027	PM 50% standard	Görler Tobias (MPG)		6.0
		Balestri Alessandro (EPFL)		3.0
		Becoulet Marina (CEA)		4.0
		De Lucca Brenno (EPFL)		3.0
		Dicorato Mattia (MPG)		4.0
		Dif-Pradalier Guilhem (CEA)		4.0
		Donnel Peter (CEA)		4.0
		Jitsuk Taweesak (DIFFER)		3.0
		LoCascio Guillaume (MPG)		3.0

Year	Subcategory	Name	Description	PMs
		Mariani Alberto (02-CNR)		4.0
		Pueschel M.J. (DIFFER)		5.0
		Sarazin Yanick (CEA)		2.0
		Sheffield Heit Facundo (MPG)		4.0
		Ulbl Philipp (MPG)		6.0
		Zhang Haoran (EPFL)		5.0
		SUBTOTAL:	*Total Manpower [PMs]*	60.0
			Total Costs [k€]	649.500
		TOTAL:	*Sum of proposed Manpower [PMs]*	120.0
			Sum of Total Costs for proposed Manpower [k€]	1,289.250

Total Costs for proposal including indirect costs [k€]: 1,289.250

Total indirect costs [k€]: 257.850

Total requested EUROfusion consortium contribution [k€]: 644.625

Attachments:

Following files have been attached by the proponent to support the proposal:

Confirmation_from_CEA_TSVV-A.pdf

Confirmation_from_DIFFER_TSVV-A.pdf

Confirmation_from_ENEA_TSVV-A.pdf

Confirmation_from_EPFL_TSVV-A.pdf

Confirmation_from_IPP_TSVV-A.pdf

CV_Balestri_Alessandro.pdf

CV_Becoulet_Marina.pdf

CV_DeLucca_Brenno.pdf

CV_Dicorato_Mattia.pdf

CV_Dif-Pradalier_Guilhem.pdf

CV_Donnel_Peter.pdf

CV_Goerler_Tobias.pdf

CV_Jitsuk_Taweesak.pdf

CV_Lo-Cascio_Guillaume.pdf

CV_Mariani_Alberto.pdf

CV_Pueschel_MJ.pdf

CV_Sarazin_Yanick.pdf

CV_Sheffield_Facundo.pdf

CV_Ulbl_Philipp.pdf

CV_Zhang_Haoran.pdf

TSVV_A_Scientific_Proposal.pdf