

Next Physics Studies with FACETS

Alexei Y Pankin

Physics Studies with FACETS	Readiness/ Needs	Timeframe/ Who is involved
<p>Investigate the plasma transport in plasma core including the H-mode pedestal region</p> <p>Paleoclassical transport in the plasma edge region near the separatrix</p> <p>Particle transport including the effect of neutral fueling</p>	<p>Particle transport is ready, $\langle \nabla \cdot Q_e^{pc} \rangle$, issue with magnetic multiplier</p>	<p>Tech-X U-Wisc (Jim) GA (Rich)</p>
<p>ETG thermal transport at the top of separatrix</p>	<p>Ready now</p>	<p>Tech-X GA (Rich)</p>
<p>Study of model stiffness</p> <p>Dependence on the boundary conditions</p> <p>Effect of plasma current evolution on the model stiffness</p>		
<p>Verification studies</p> <p>Anomalous transport GLF23 and TGLF models using XPTOR and TGYRO codes</p>		
<p>Neoclassical models for bootstrap current in FACETS, TRANSP, and XGC0</p>	<p>Implement Sauter model in FACETS</p>	

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Study of ELM crashes using Reduced model for ELMs	Models for pedestal, crash, MHD stability (ELITE?, DCON), UEDGE interface	
Fluid modeling of pedestal buildup and crash	Implement BOUT++/FACETS interface	
ELM mitigation	Coupling TORIC in FACETS	
ITER studies	Equilibrium	
Evolution of toroidal (and poloidal) momentum	Modify core solver	

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Sawtooth crashes Kadomtsev model	Model needs to be implemented	
Porcelli model	Model needs to be implemented Require accurate implementation of δW_{MHD}	
Model for NTMs	Model for NTM need to be implemented	
Transport associated with micro-tearing modes		
KBM		
Pankin FACETS 2011		

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- **Main focus is on helping experimentalists with experimental programs by participating in this year JRT milestone on the understanding of the H-mode pedestal structure**
- **1st priority tasks**
 - **Understand role of paleoclassical transport in the pedestal**
 - Additional development: Fix magnetic multiplier, Implement paleoclassical heat flux
 - Participants: Tech-X, GA, U-Wisc, LLNL
 - Deadline: First results by TTF meeting; contribute to the JRT report (October/November)
 - **Develop discharge scenarios that will help experimentalists to illuminate the role of ETG anomalous transport**
 - Participants: Tech-X, GA
 - Deadlines: First results by TTF
 - **Verify and improve the neoclassical models for the bootstrap current**
 - Additional development: Implement Sauter model in FACETS
 - Participants: Tech-X, Lehigh, PPPL
 - Deadlines: First results by spring CPES meeting, More results by APS
- **2nd priority tasks**
 - **Reduced model of ELMs**
 - Additional development: Model for pedestal, ELM crash, MHD stability, UEDGE and WALLPSI interfaces
 - Participants: Tech-X, UCSD, LLNL
 - Deadline: First results by APS
- **Other tasks: ITER modeling, models for sawtooth, NTM, toroidal momentum dynamics are contingent to additional development in FACETS mainly on equilibrium solver development and core transport solver in FACETS**