6th Festival de Théorie

(4-22 July, 2011)

"General Principles for Relaxation & Self Organization"

Programme

This document contains 2 parts:

- **Part I** **is a tentative list of topics**. Names of leaders are attached to it. These leaders are expected to **organize the round table discussions, working sessions**, **the reporting and discussion sessions.** Feel free to add new topics, related to the Festival theme.

- **Part II** is a draft of agenda. **Participants should check their availability and send a title back to the organizers**.

Tutorial talks are there to introduce the various aspects of the Festival main topics. A substantial fraction of a tutorial should be pedagogical. In particular they should be accessible to the various scientific communities present in the audience. Jargon should be avoided as much as possible.

Invited talks are more focused and should highlight results related to the Festival theme.

Lectures are intended to students and young physicists, to clarify some of the concepts and results presented (or to be presented) in tutorials. **Blackboard style** is expected.
Senior physicists are not expected to attend lectures; more explicitly, **scientists above the rank of student or post-doc are forbidden to attend the lectures** unless they get special permission from the lecturer.
It is intended to publish these lectures. **Participants whose names appear in the provisional agenda should mention whether they accept to present and write a lecture.**

During **Round Table Discussions**, **talks should not exceed 10 minutes (Blackboard style)**. Candidates should contact the organizers to get a slot (please send a title and a short abstract). Students are encouraged to participate to these round tables: they are an opportunity for them to present their results.

PART I Proposed topics for the 2011 Festival

The list of topics remains open. It is the choice of each individual to participate to any of these topics or to initiate a new topic. At any rate, active participation to the scientific life of some of these topics is expected. **Contributions to round table discussions should be very short**: typically 5 to 10 minutes. In other words, round table discussions are not meant to mini-talks, but rather to present new ideas and/or comments. **Attendance** to round table discussions **is NOT mandatory**. Jargon must be avoided.

The leaders are in charge of this scientific life. More precisely, they are in charge of collecting the presentations and of introducing the topic.

Topic 1: **Momentum generation & transport**
Leader: Chris Mc Devitt
Deputy Leaders: Jérémie Abiteboul, Özgur Gürcan, Sung Sik Kim

Topic 2: **General theorems for self-organization (H-theorem, *etc.*)**
Leader: Eun-Jin Kim
Deputy Leaders: Guilhem Dif-Pradalier, Yusuke Kosuga, Antoine Strugarek

Topic 3: **Reconnection & MHD turbulence**
Leader: Roland Grappin
Deputy Leaders: Akihiro Ishizawa, Thimothée Nicolas, Seiya Nishimura

Topic 4: **Energetic particles**
Leader: Maxime Lesur
Deputy Leaders: Dominique Escande, Antoine Merle, David Zarzoso

PART II Tutorial talks, lectures & agenda of the 2011 Festival

Please check your availability in the agenda, and send a title back to the organizers. Please make sure that part of your presentation is related to the festival main theme. If not possible, please contact the chairman and vice-chairman.

List of TUTORIALS

Speaker	Title
Boozer Allen	Separation of Plasma Physics by Certainty
Breizman Boris	Instabilities and relaxation processes in weakly driven systems
Brummel Nic	Zonal flows? Relaxation? Self-organisation? Magnetic confinement? The solar tachocline has got it all!
Diamond Pat	Zonal Flows and Drift Wave Turbulence: A look Back and a Look Ahead, with Emphasis on the L-H Transition
Dif-Pradalier	
Garbet Xavier	
Hahm Taik Soo	Toroidal momentum transport & intrinsic rotation: theory-experiment comparisons
Hughes David	Beta plane MHD turbulence
Kang Hyesung	Particle Acceleration at Astrophysical Shocks
Passot Thierry	Fluid modeling of waves and turbulence in space plasmas
Ryu Dongsu	Astrophysics in Hot Tenuous Media: Plasma Physics Issues in Galaxy Clusters
She Zhen-Su (Rosenbluth Lecture)	An analytic theory of wall-bounded turbulent flow
Smolyakov Andrei	Elements of Neoclassical Theory and Plasma Rotation in tokamak
Tobias Steve	Direct Statistical Simulation of the Driving and Modification of Zonal Flows
Waelbroek François	

List of INVITED

Speaker	Title
Belmont Gérard	Collisionless dissipation: the case of the linear Landau damping
Beyer Peter	Turbulence in tokamaks: transport barrier dynamics and effect of magnetic islands
Bos Wouter	Self-organization and depletion of nonlinearity in turbulence and mixing

Brun Sacha	
Escande Dominique	Random phase without approximation in quasi-linear theory
Farge Marie	Energy dissipating structures in 2D wall turbulence in the limit of vanishing viscosity
Forest Cary	Stirring unmagnetized plasma
Grappin Roland	Different regimes of MHD turbulence with mean magnetic field
Gervilly Céline	Effects of magnetic boundary conditions on mechanically driven dynamos
Gürcan Özgur	
Ida Katsumi	Multi-stage transition and front propagation of Edge and Internal Transport Barriers in tokamaks
Ishizawa Akihiro	Interaction of turbulence and macro-MHD
Kwon Jae-Min	
Leconte Michael	Effect of Resonant Magnetic Perturbations on secondary structures in Drift-Wave turbulence
Mima Kunioki	Weibel turbulence in laser plasmas
Müller Wolf	The inverse cascade of magnetic helicity and alpha-dynamo quenching
Nguyen-van-Yen Romain	Dissipation by flows
Nishimura Seiya	Magnetic reconnection and plasma flows in helical devices
Plihon Nicolas	How boundary conditions influence the VKS dynamo
Schneider Kai	On the origin of Lagrangian intermittency in drift-wave turbulence
Silvers Lara	Magnetic Buoyancy Instabilities and Magnetic Flux Pumping at the Base of the Convection Zone
Wang Lu	Kinetic theory of the turbulent energy pinch in tokamak plasmas
Xu Guosheng	Recent progress in understanding the L-H transition in fusion plasmas
Zhu Jian-Zhou	Exact gyrokinetic absolute equilibrium

List of LECTURES

Speaker	Title
Boozer Allen	Reconnection in Naturally Arising Magnetic Fields
Breizman Boris	Instabilities and relaxation processes in weakly driven systems
Brummel Nic	Our favourite MHD lab -- the solar dynamo: Theoretical pieces that work and pieces that don't
Diamond Pat	The Principals and their principles: a look at how Lynden-Bell, Bretherton and Batchelor thought about relaxation in turbulent flows
Garbet Xavier	
Hughes David	Beta plane MHD turbulence

Kang Hyesung	Particle Acceleration at Astrophysical Shocks
Passot Thierry	Introduction to Landau fluids
Ryu Dongsu	Astrophysics in Hot Tenuous Media: Plasma Physics Issues in Galaxy Clusters
She Zhen-Su	Similarity analysis of turbulence beyond Prandtl and Kolmogorov
Smolyakov Andrei	Elements of Neoclassical Theory and Plasma Rotation in tokamak
Waelbroek François	

SCHEDULE

Typical organization of 1 day:

1-2 tutorial(s) in the morning ..... 60 minutes
+ "Organized" round table discussion..... with 5 to 10 minutes contributions (blackboard style)
1-2 invited talks in the afternoon ..... 30 minutes
+ Informal discussions ..... blackboard style (no slides)
+ Informal working groups in the afternoon ..... self-organized
+ 4 to 5 lectures per week (for students) ..... 60 minutes + 30 min. for questions & discussion (blackboard style)

Color code: **Tutorial**
Invited
Lecture
Round table (RT) or Working session.

Important remark for those of you interested in L-H physics issues:
A few afternoon parallel sessions will be organized during the 2nd week (especially on Tuesday 12), devoted to the physics of the transition from Low to High confinement regimes in controlled fusion plasmas. This activity is led by George Tynan. The dedicated program should circulate soon.

1st week

		9:00-9:30	9:30-10:00	10:00-10:30		11:00-11:30	11:30-12:00		14:30-15:00	15:00-15:30	15:30-16:00	16:00-17:30
Monday	**4**	Thierry Passot		Discussion	Coffee break	Kunioki Mima	Wouter Bos	LUNCH	Kai Schneider	Student's welcome		Lecture Passot
Tuesday	**5**	Boris Breizman		Discussion		RT 3 (Reconnection & MHD turbulence)			Wolf Müller	Roland Grappin	Discussion	Lecture Boozer
Wednesday	**6**	Romain Nguyen-van-Yen	Discussion			RT 1 (Momentum generation & transport)			Sacha Brun	Lara Silvers	Discussion	Lecture Brummel
Thursday	**7**	Nic Brummel		Discussion		RT 4 (Energetic particles)			Nicolas Plihon	Cary Forest	Discussion	Lecture Diamond
Friday	**8**	T S Hahm		Discussion		RT 2 (General theorems for self-organization)			Zhen-Su She (Rosenbluth lecture)			Lecture Breizman

2nd week

		9:00-9:30	9:30-10:00	10:00-10:30		11:00-11:30	11:30-12:00		14:30-15:00	15:00-15:30	15:30-16:00	16:00-17:30
Monday	**11**	Pat Diamond		Discussion	Coffee break	RT 1 (Momentum generation & transport)		LUNCH	Steve Tobias		Discussion	Lecture She
Tuesday	**12**	Allen Boozer		Discussion		Focus: L-H physics issues			Gérard Belmont	Seiya Nishimura	Discussion	Lecture Hughes
Wednesday (Evening Banquet)	**13**	David Hughes		Discussion		RT 4 (Energetic particles)			Dongsu Ryu		Katsumi Ida	Lecture Ryu / Kang
Thursday	**14**	BASTILLE DAY										
Friday	**15**	Hyesung Kang		Discussion		Focus: Intergalactic magnetic fields			Céline Guervilly	Dominique Escande	Discussion	

3rd week

		9:00-9:30	9:30-10:00	10:00-10:30		11:00-11:30	11:30-12:00		14:30-15:00	15:00-15:30	15:30-16:00	16:00-16:30	16:30-17:00	17:00-17:30
Monday	**18**	François Waelbroek		Discussion	Coffee break	RT 2 (General theorems for self-organization)		LUNCH	Özgur Gürcan	Guosheng Xu	Discussion	Lecture Waelbroek		
Tuesday	**19**	Guilhem Dif-Pradalier		Discussion		RT 3 (Reconnection & MHD turbulence)			Jae-Min Kwon	Peter Beyer	Discussion	Lecture Smolyakov		
Wednesday	**20**	Andrei Smolyakov		Discussion		RT 1 (Momentum generation & transport)			Lu Wang	ITER Session		Student's projects		
Thursday	**21**	Jian-Zhou Zhu	Akihiro Ishizawa	Discussion		Marie Farge	Michael Leconte		Student's reporting		Summary			
Friday	**22**	Closing												