

# Sign Problems and Complex Actions

## workshop at ECT\* Trento

**Monday March 2 - Friday March 6 2009**

### **Monday March 2**

09:00 - 10:00	registration	
	<i>chair: Gert Aarts</i>	
10:00 - 11:15	Kim Splittorff	QCD with fixed complex fermion determinant
11:15 - 11:45	Coffee	
11:45 - 12:30	David Reeb	The severity of the sign problem in different regions of the dense-QCD phase diagram
12:30 - 14:00	Lunch	
	<i>chair: Chris Allton</i>	
14:00 - 14:45	Shinji Ejiri	A method to avoid the sign problem in finite density
14:45 - 15:30	Jacques Bloch	Random matrix theory as playground for the sign problem
15:30 - 16:00	Coffee	
16:00 - 17:00	Discussion	General (Philippe de Forcrand)
19:00 - 21:00	Buffet	

### **Tuesday March 3**

	<i>chair: Francesco Di Renzo</i>	
09:30 - 10:45	Boris Svistunov	Diagrammatic Monte Carlo
10:45 - 11:15	Coffee	
11:15 - 12:00	Barak Bringoltz	Baryon chemical potential in large N QCD
12:00 - 12:30	Discussion	Morning session
12:30 - 14:00	Lunch	
	<i>chair: Owe Philipsen</i>	
14:00 - 14:45	Dean Lee	Symmetries, signs, and complex actions in lattice effective field theory
14:45 - 15:30	Atsushi Nakamura	Searching paths to understand systems with a complex action
15:30 - 16:00	Coffee	
16:00 - 17:00	Panel Discussion	Diagrammatics (Shailesh Chandrasekharan)

### **Wednesday March 4**

	<i>chair: Philippe de Forcrand</i>	
09:30 - 10:45	Ion Stamatescu	What can we do with the complex action?
10:45 - 11:15	Coffee	

11:15 - 12:00	Erhard Seiler	Complex Langevin: Mathematical results and problems
12:00 - 12:30	Discussion	Morning session
12:30 - 14:00	Lunch	
<b><i>chair: Kim Splittorff</i></b>		
14:00 - 14:45	Denes Sexty	Real time simulations using stochastic quantisation
14:45 - 15:30	Gert Aarts	Finite chemical potential with complex Langevin
15:30 - 16:00	Coffee	
16:00 - 17:00	Panel Discussion	Complex Langevin (Francesco Di Renzo)
20:00 - 23:59	Workshop banquet	

## Thursday March 5

### ***chair: Dean Lee***

09:30 - 10:45	Shailesh Chandrasekharan	Solution to sign problems in the worldline approach
10:45 - 11:15	Coffee	
11:15 - 12:00	Urs Wenger	Solution of a sign problem by explicit bosonisation in two and three dimensions
12:00 - 12:30	Discussion	Morning session
12:30 - 14:00	Lunch	

### ***chair: Maria-Paula Lombardo***

14:00 - 14:45	Philippe de Forcrand	Finite temperature and density QCD in the strong coupling limit
14:45 - 15:15	Gergeli Endrodi	The curvature of the QCD phase transition line
15:15 - 15:45	Coffee	
15:45 - 17:00	Panel Discussion	Worldline methods (Gert Aarts)

## Friday March 6

### ***chair: Sandor Katz***

09:30 - 10:45	Maria-Paula Lombardo	Imaginary chemical potential and Taylor expansion: Mix & match
10:45 - 11:15	Coffee	
11:15 - 12:00	Massimo D' Elia	Issues in analytic continuation: Spectral properties and the critical line
12:00 - 12:30	Discussion	Morning session
12:30 - 14:00	Lunch	

### ***chair: Shailesh Chandrasekharan***

14:00 - 14:45	Bartolome Alles	The mass gap of the 2D O(3) model at theta=pi
14:45 - 15:30	Panel Discussion	Lattice QCD at finite mu (Owe Philipsen)
15:30 - 16:00	Coffee	
16:00 - 17:00	Workshop	Summary