

HORAIRE / *PROGRAM*

ATELIER SUR

**LES MÉTHODES MATHÉMATIQUES ET INFORMATIQUES  
POUR LES SYSTÈMES QUANTIQUES**

11 au 14 décembre 2018

*WORKSHOP ON*

***MATHEMATICAL AND COMPUTATIONAL METHODS  
FOR QUANTUM SYSTEMS***

*December 11–14, 2018*

**CONFÉRENCES :** salle 6254 (Pavillon André-Aisenstadt)

**PAUSES-CAFÉ :** salle 6245 (Pavillon André-Aisenstadt)

**LECTURES:** *Room 6254 (Pavillon André-Aisenstadt)*

**COFFEE BREAKS:** *Room 6245 (Pavillon André-Aisenstadt)*

**Le mardi 11 décembre 2018 / Tuesday, December 11, 2018**

08:15–08:45 Inscription (salle 5345) et café-croissants (salle 6245)  
*Registration (Room 5345) and Coffee & Croissants (Room 6245)*

08:45–09:00 Introduction / *Opening remarks*

***Analysis, PDE (salle/Room )***

**09:00–10:00 Catherine Sulem** (University of Toronto)  
*“Global wellposedness and soliton resolution for the derivative nonlinear Schrödinger equation”*

10:00–10:30 Pause-café / *Coffee break*

**10:30–11:30 Adam M. Oberman** (McGill University)  
*“Partial differential equations approaches to optimization and regularization of Deep Neural Networks”*

**11:30–12:30 David Poulin** (Université de Sherbrooke)  
*“Advances in algorithms for the simulation of quantum systems on a quantum computer”*

12:30–14:00 Pause-déjeuner / *Lunch break*

***Dirac (salle/Room )***

**14:00–15:00 Lihui Chai** (Sun Yat-Sen University)  
*“Frozen Gaussian Approximation for the Dirac equation in semi-classical regime”*

**15:00–16:00 Yong-Yong Cai** (Beijing Computational Science Research Center)  
*“Super-resolution property of splitting methods for Dirac equation in the nonrelativistic limit regime”*

16:00–16:30 Pause-café / *Coffee break*

**16:30–17:30 François Fillion-Gourdeau** (University of Waterloo)  
*“Challenges in the description and observation of the Schwinger mechanism”*

**17:30–18:00 Szczepan Chelkowski** (Université de Sherbrooke)

**Le mercredi 12 décembre 2018 / *Wednesday, December 12, 2018***

08:30–09:00 Café croissants / *Coffee & Croissants*

***Experiment & Theory Quantum Physics (salle/Room )***

**09:00–10:00 Barbara A. Jones** (IBM)  
*“Emergent magnetism in Titanium Nitride”*

10:00–10:30 Pause-café / *Coffee break*

**10:30–11:30 Michael Spanner** (National Research Council of Canada)  
*“Strong-field induced vibronic coupling”*

***Theo. Photonics, Laser (salle/Room )***

**11:30–12:30 XueBin Bian** (Chinese Academy of Sciences, Wuhan Institute of Physics and Mathematics)  
*“Numerical simulations of high-order harmonic generation from solids”*

12:30–14:00 Pause-déjeuner / *Lunch break*

***Numerical Methods in Quantum Physics (salle/Room )***

**14:00–15:00 Robert L. Jerrard** (University of Toronto)  
*“Dynamics of superconducting interfaces”*

**15:00–16:00 Xu Yang** (University of California Santa Barbara)  
*“Mean-field models for spin-magnetization coupling in ferromagnetic materials and semiclassical limit”*

16:00–16:30 Pause-café / *Coffee break*

**16:30–17:30 Christophe Besse** (Université Paul Sabatier Toulouse 3)  
*“Energy preserving method for nonlinear Schrödinger equations”*

Le jeudi 13 décembre 2018 / *Thursday, December 13, 2018*

08:30–09:00 Café croissants / *Coffee & Croissants* (Salle / Room 4e étage salle 4362 / 4th floor Room 4362)

### **CS, HPC (salle/Room )**

**09:00–10:00 Yousef Saad** (University of Minnesota)  
*“Divide and conquer algorithms and software for large Hermitian eigenvalue problems”*

10:00–10:30 Pause-café / *Coffee break* (Salle / Room : 4e étage salle 4362 / 4th floor Room 4362)

**10:30–11:30 Sihong Shao** (Peking University)  
*“Dirac equation: Calculation and analysis”*

**11:30–12:30 Jérémie Gaidamour** (CNRS - Université de Lorraine)  
*“A parallel computation of the stationary states of rotating Bose-Einstein condensates using an iterative pseudo-spectral method”*

12:30–14:00 Pause-déjeuner / *Lunch break*

### **Numerical Analysis (salle/Room )**

**14:00–15:00 Alexander Ostermann** (University of Innsbruck)  
*“Low regularity Fourier integrators”*

**15:00–16:00 Lili Ju** (University of South Carolina)  
*“Localized exponential time differencing methods: Algorithms and analysis”*

16:00–16:30 Pause-café / *Coffee break* (Salle / Room : 4e étage salle 4362 / 4th floor Room 4362)

**16:30–17:30 Karolina Kropielnicka** (University of Gdansk)  
*“Splitting methods for Schrödinger equations with time dependent potentials; many problems, many approaches”*

Le vendredi 14 décembre 2018 / *Friday, December 14, 2018*

08:30–09:00 Café croissants / *Coffee & Croissants*

**09:00–10:00 Neepa T. Maitra** (Hunter College of the City University of New York)  
*“Exact factorization approach to coupled electron, ion and photon dynamics”*

10:00–10:30 Pause-café / *Coffee break*

***Numerical Methods in Quantum Physics, Laser (salle/Room )***

**10:30–11:30 Romain Duboscq** (Institut National des Sciences Appliquées de Toulouse)  
*“On the modeling and simulation of anyons systems ”*

**11:30–12:30 Marianna Lytova** (University of Ottawa)  
*“Numerical modeling of rotational effects in N<sub>2</sub><sup>+</sup> lasing”*

12:30–12:45 Conclusion / *Closing remarks*