

**GDR NBODY Workshop**  
**“Electron Many-Body Interactions with Quantum Particles and Fields”**  
*Collège Doctoral Européen, Strasbourg, France, January 15-17, 2025*

**Organizers:** Morgane Vacher (CEISAM, Nantes), Saad Yalouz (LCQS, Strasbourg), and Emmanuel Fromager (LCQS, Strasbourg).

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**Wednesday, January 15<sup>th</sup>**

**Chair:** J. Toulouse

13:50 – 14:00 *Welcome words, the organizers.*

14:00 – 14:50 **Scott M. Garner**, Princeton University, USA.  
*“Dynamics with Nuclear-Electronic Orbital Density Functional and Wavefunction Theories”*

14:50 – 15:30 **Aurélien de la Lande**, Paris-Saclay University, France.  
*“Density Functional Theory Approaches for Ab Initio Modelling of Radiation Chemistry”*

15:30 – 15:55 **Damian Contant**, Sorbonne Université, Paris, France.  
*“Evaluating nuclear forces with the Optimized Effective Potential approach”*

16:00 – 16:40 **Coffee break**

**Chair:** M. Vacher

16:40 – 17:20 **Jean-Christophe Tremblay**, Lorraine University, France.  
*“Molecular Quantum Dynamics in Stochastic Dissipative Media”*

17:20 – 17:45 **Emmanuel Giner**, LCT, Sorbonne Université & CNRS, Paris, France.  
*“A Rigorous Density Functional Formulation for QM-MM Problems in the Canonical Statistical Ensemble”*

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**Thursday, January 16<sup>th</sup>**

**Chair:** E. Fromager

08:40 – 09:35 **Thomas Ebbesen**, ISIS, Strasbourg, France.  
*“Manipulating Matter by Strong Coupling to the Vacuum Electromagnetic Field”*

09:35 – 10:00 **Lucien Dupuy**, Strasbourg University, LCQS, France.  
*“Exact Factorization-based Surface Hopping Without Velocity Adjustment: appeal of phase-space formulation for non-adiabatic dynamics”*

10:00 – 10:40 **Coffee break**

10:40 – 11:30 **Federica Agostini**, Paris-Saclay University, France.  
*“Theory and simulation of ultrafast processes in molecules”*

11:30 – 11:55 **Benjamin Bacq-Labreuil**, IPCMS, Strasbourg, France.  
*“Towards an Ab Initio Theory for High-Temperature Superconductors”*

12:15 – 14:00 **Lunch at the University restaurant “Le 32”**

**Chair: S. Yalouz**

14:00 – 14:50 **Heiko Appel**, Max Planck Institute, Hamburg, Germany.  
*“Light-matter interactions within the Ehrenfest-Maxwell-Pauli-Kohn-Sham framework: fundamentals, implementation, and applications”*

14:50 – 15:30 **Rémi Avriller**, LOMA, Bordeaux, France.  
*“Chirality and Dimensionality in the Ultrastrong Light-matter Coupling Regime: from the Foucault pendulum to the Spyrograph game”*

15:30 – 15:55 **Benjamin Tirado**, Materials Physics Center, Donostia, Spain.  
*“Design of quantum circuits to study dissipative processes in plasmonic systems”*

16:00 – 18:00 **Poster session and aperitif**

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## Friday, January 17<sup>th</sup>

*Chair: M. Vacher*

08:45 – 09:35 **Enrico Ronca**, Perugia University, Italy.  
*“Strong Light-Matter Coupling by Ab-Initio Methodologies”*

09:35 – 10:00 **Jérémy Morere**, LPCT - CNRS and Université de Lorraine, Nancy, France.  
*“Arbitrariness of the degree of complexity of nested commutators in equation-of-motion formalism”*

10:00 – 10:40 **Coffee break**

**Chair: L. Dupuy**

10:40 – 11:20 **Scott M. Garner**, Princeton University, USA.  
*“Nuclear-Electronic Orbital Approach for Electronic and Vibrational Polaritons”*

11:20 – 12:00 **Johannes Schachenmayer**, CESQ, Strasbourg, France.  
*“Dark chemistry in the large-N limit”*

12:00 – 12:10 *Concluding remarks, the organizers.*