

CATMIN

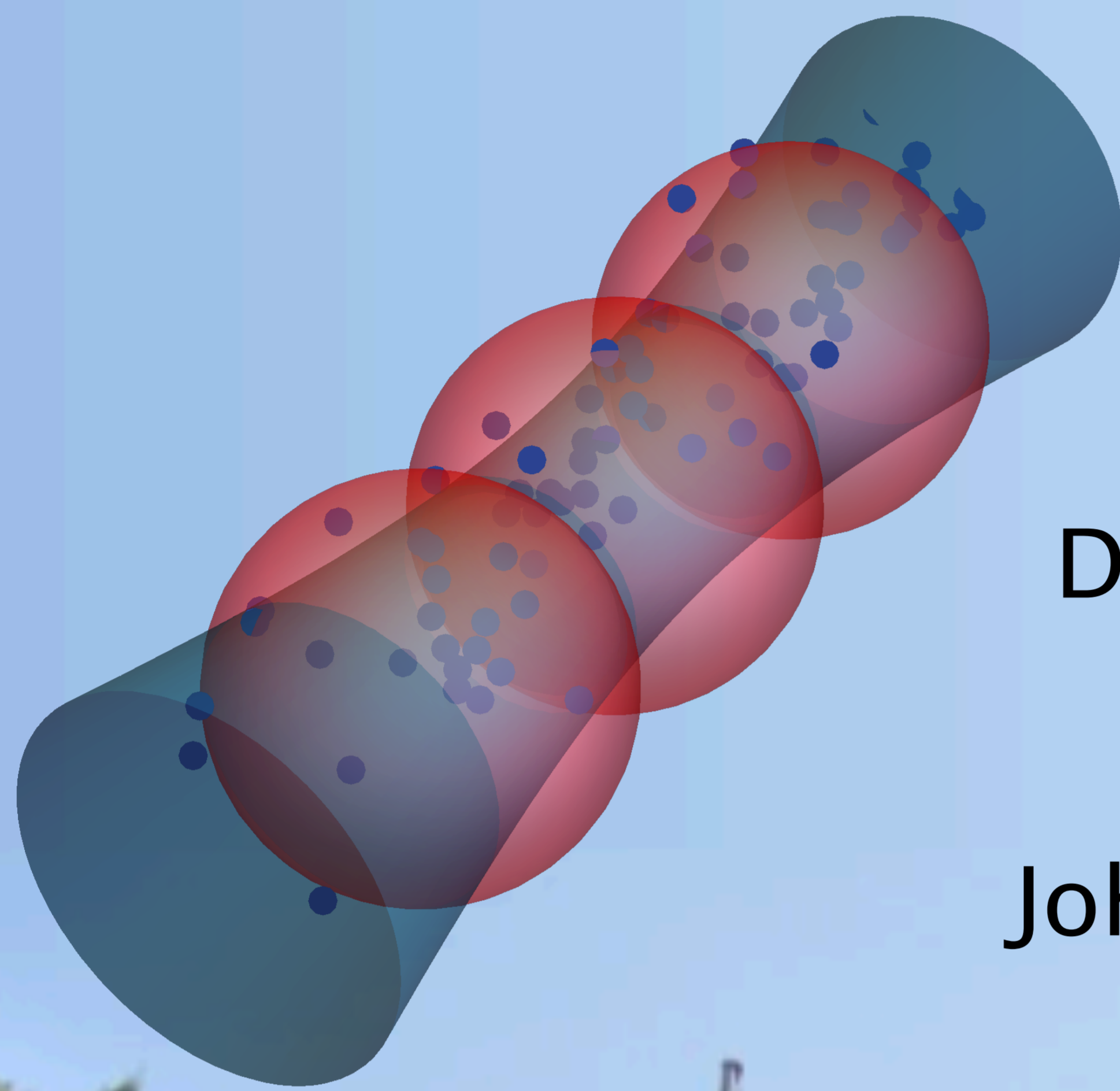
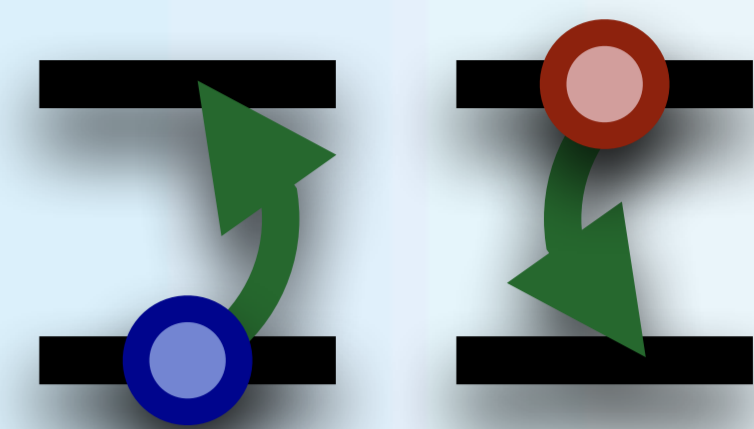
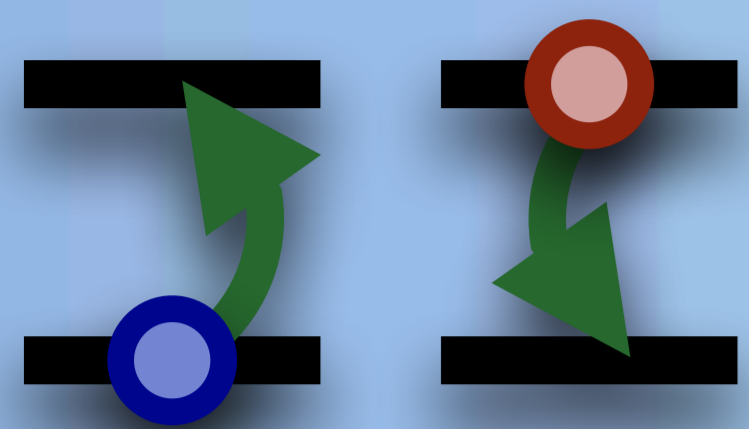
Cold ATom Molecule INteractions

July 22nd-23rd 2019

ENS Paris-Saclay, Cachan, France

<https://catmin.sciencesconf.org>

**Focus: Cold Rydberg atoms for
quantum simulation and information**



Invited speakers

Ilya Beterov
Donatella Ciampini
Daniel Comparat
Robin Côté
Johannes Deiglmayr
Barry Dunning
Tom Gallagher
Sébastien Gleyzes

Markus Hennrich
Matthew Jones
Igor Lesanovsky
Mikhail Lukin
Kang-Kuen Ni
Tilman Pfau
Francis Robicheaux
Mark Saffman

CATMIN is a new satellite of ICPEAC, devoted to the studies of cold collisions and interactions in cold atomic or molecular gases. The first CATMIN workshop is centered on **cold Rydberg atom physics** with applications to quantum information and quantum simulation



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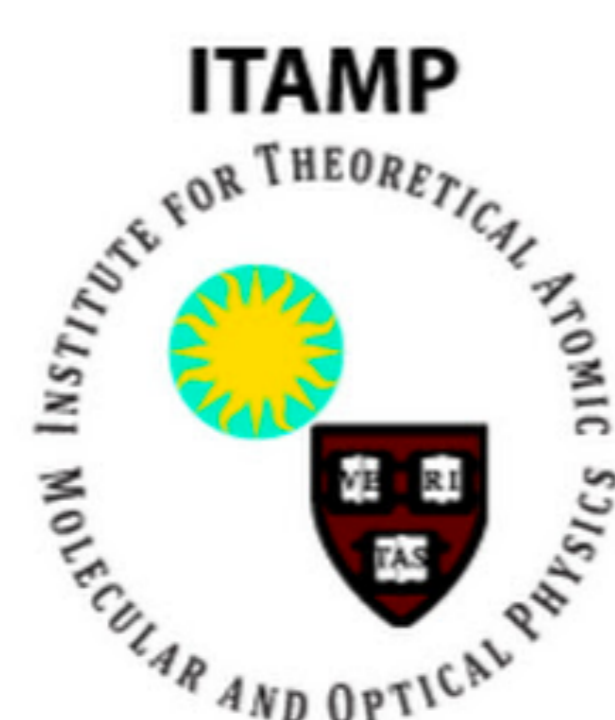


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On the road for ICPEAC: Long-Range Rydberg interactions in cold gases (Monday 22/07)

08:30 Welcome coffee at ENS Paris-Saclay (Cachan)

09:00 Introduction, P. Pillet

09:15 Why Rydberg atoms are so interesting: half century research, T. F. Gallagher

Rydberg interactions and long-range molecules (Chair: H. Sadeghpour)

09:45 Rydberg-dressing to engineer ultra-long-range molecules, R. Côté

10:15 Hetero-nuclear Rydberg molecules, J. Deiglmayr

10:45 Coffee break (30')

Interactions, entanglement and quantum gates (Chair: P. Grangier)

11:15 Quantum computation using Rydberg atoms, M. Saffman

11:45 Three-body Forster resonances for three-qubit quantum gates, I. Beterov

12:15 Collisions and interactions between cold Rydberg atoms, F. Robicheaux

12:45 Lunch buffet + Poster session

Rydberg frontiers (Chair: T. Killian)

14:00 Studying positive and negative ions with Rydberg spectroscopy, T. Pfau

14:30 Quantum metrology with Rydberg atoms, S. Gleyzes

15:00 Coffee break (30')

Many-body systems and quantum simulation (Chair: F. Merkt)

15:30 Driven dissipative dynamics in an open many-body quantum system, D. Ciampini

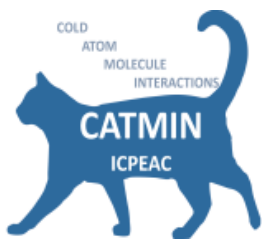
16:00 Localization in spin chains with facilitation constraints and disordered interactions, I. Lesanovsky

16:30 Quantum simulation with Rydberg atoms, M. Lukin

17:00 Departure of people participating to tutorials in Caen

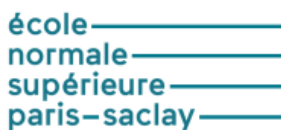
17:15 General assembly + board meeting of CATMIN

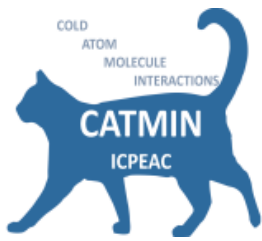
20:00 Conference Diner



CATMIN on frontiers of ICPEAC (Tuesday 23/07)

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| 09:00 | Prospective in cold Rydberg atoms and cold molecules (Moderator: R. Gonzales Ferez) |
| 09:05 | Divalent Rydberg gases for quantum metrology and simulation, M. Jones |
| 09:25 | Ultra-long range Rydberg molecules, B. Dunning |
| 09:45 | Cold molecules and cold chemistry, K.-K. Ni |
| 10:05 | Debate |
| 10:25 | Coffee break (30') |
| 10:55 | New quantum technologies with cold Rydberg atoms and ions (Moderator: A. Browaeys) |
| 11:00 | Interacting Rydberg ions, M. Hennrich |
| 11:20 | Sources of mono-energetic sources of charged particles, D. Comparat |
| 11:40 | Debate |
| 12:00 | Concluding remarks by H. Sadeghpour and P. Pillet |
| 12:30 | Lunch with sandwiches |





Poster session (Monday 22/07) List of posters

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| 1 | C. Chen | Towards Quantum Gas Microscope for ^{87}Rb - ^{85}Rb Mixture |
| 2 | M. Favier | Towards quantum simulation with laser-trapped circular Rydberg atoms |
| 3 | C. Fey | Alignment of s-state Rydberg molecules in magnetic fields |
| 4 | M. Gronowski | Ultracold collisions of alkali-metal and alkaline-earth-metal ions with spin-polarized metastable helium atoms. |
| 5 | T. Killian | Probing Spatial Correlations with Rydberg Molecules |
| 6 | L. Lassabliere | Controlling collisions of ultracold dipolar molecules with a microwave field |
| 7 | S. Lepoutre | Towards Optical Manipulation of cold Ytterbium atoms in Rydberg states |
| 8 | M. Schlosser | Defect-free assembly of 2D clusters of single atoms with Rydberg interactions in a multilayer Talbot optical lattice |
| 9 | E. Stourm | Rydberg atom near an optical nanofiber |
| 10 | N. Takei | Developing an experimental apparatus for cold Ytterbium Rydberg atoms |
| 11 | M. Wagner | Probing many-body correlations in Fermi gases using Rydberg excitations |
| 12 | M. Weidemüller | Observation of glassy dynamics in a disordered Rydberg spin system |
| 13 | S. Whitlock | Non-equilibrium universality in a driven Rydberg gas |
| 14 | F. Yang | Spin-Exchange Collisions between Propagating Photons and a Single Atom |