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Colloquium of the Physics Department of ENS

Mercredi 9 Novembre 2022, 13 :30
DPT-PHYS-ENS, Amphi Jaurès - 24 rue Lhomond 75005 PARIS
Domaines : physics

Titre : *Quantum Science with Rydberg Atoms*

Orateur : **Serge Haroche (Laboratoire Kastler Brossel - Collège de France)**

Résumé : *The exaggerated properties of Rydberg atoms (enormous sizes, very long life times..) make them extremely sensitive to their environment. These giant atoms can now be prepared and manipulated by laser excitation with an exquisite precision. They interact very strongly with microwave photons and between each other, at distances which are huge at the atomic scale. These features make them ideal tools to explore fundamental quantum phenomena, to build quantum gates and to realize quantum simulators of condensed matter systems.*

In the first part of the talk I will recall the early history of Rydberg atom physics and the Cavity Quantum Electrodynamics experiments which have made possible the entanglement of atoms and the non-destructive manipulation and detection of single photons. In the second part, I will describe recent studies in which arrays of Rydberg atoms are interacting with each other in a controlled way, opening promising perspectives in quantum information science.

(the slides will be in English and the oral presentation in French)