

**RYDBERG ATOMS, CAVITIES AND CRYOGENIC TRAPS FOR
INFORMATION PROCESSING**

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Circular Rydberg states exhibit very remarkable properties which make them interesting candidates for simple demonstration experiments in quantum information processing. They are long lived, strongly coupled to the microwave field and can be easily detected. I will present in my talk, experimental results about the repeated, non destructive measurement by circular atoms of a field stored in a new generation of superconducting cavity, developed in our group. We are also aiming at coupling the Rydberg levels to cold surfaces or integrated devices on a chip. I will present the last results we have obtained for a superconducting atom chip experiment. It will serve in the future as a source of cold Rydberg states, as well as a new tool to test the behavior of ultracold atoms in the vicinity of superconducting surfaces.