

# Alkali-earth ions Confined for Optical and Radiofrequency spectroscopy for Nuclear moments (ACORN)

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Nuclear moments have proved to be excellent probes for nuclear configurations and thus act as excellent benchmarks for nuclear theory. The magnetic octupole moment, which has for now only been measured for 19 stable isotopes, is very promising for the study of magnetization currents and the distribution of nucleons. We present the construction of the ACORN (Alkali-earth ions Confined for Optical and Radiofrequency spectroscopy for Nuclear moments) experiment, a new Paul trap experiment for the measurement of the nuclear magnetic octupole moment of alkali-earth ions. We discuss the trap and photocollection design, and their challenges in our aim to perform the first magnetic octupole measurements of stable and radioisotopes. We also discuss the choice of the first element the ACORN experiment will be performed on, and its corresponding laser system.

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