

## Radioactive molecules for nuclear science

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Molecules containing heavy and octupole-deformed radioactive nuclei are predicted to provide enhanced sensitivity to investigate distinct nuclear phenomena [1,2], test the violation of fundamental symmetries, and search for new physics beyond the Standard Model of particle physics [3,4]. However, experimental measurements of such radioactive systems are scarce, and their study requires overcoming major experimental challenges. This seminar will discuss recent spectroscopy measurements of short-lived radium fluoride molecules (RaF) and future perspectives for fundamental physics studies with these molecules.

[1] Yang et al., "Laser spectroscopy for the study of exotic nuclei", *Prog. in Part. and Nucl. Phys* 129, 104005 (2022)

[2] Udrescu et al., "Isotope shifts of radium monofluoride molecules", *Phys. Rev. Lett.* 127, 033001 (2021)

[3] Garcia Ruiz et al., "Spectroscopy of short-lived radioactive molecules", *Nature* 581 , 396 (2020)

[4] Arrowsmith-Kron et al., "Opportunities for Fundamental Physics Research with Radioactive Molecules", arXiv:2302.02165 (2023)