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Radioactive Molecules: Novel Probes for New Physics

Thursday, 17 February 2022 13:00 (24 minutes)

Molecules in which one or more of its constituting atoms contain a radioactive nucleus represent unexplored probes for new physics beyond the Standard Model of particle physics [1]. Radioactive atoms provide an additional degree of freedom to design molecular systems with, for instance, unmatched sensitivity to hitherto undiscovered permanent electric dipole moments (EDMs). Because of the link between EDMs and a violation of the combined symmetry of charge conjugation and parity (CP), the discovery of an EDM could resolve one of the most tantalising puzzles in contemporary physics, the matter-antimatter asymmetry in the universe.
In order to take advantage of the science potential of radioactive molecules, the newly-formed RadMol collaboration aims to establish a novel laboratory at TRIUMF, Vancouver, dedicated to the study of radioactive molecules and fundamental physics.
This talk will introduce the physics opportunities of radioactive molecules as well as new experimental methods necessary to master these unique precision probes.
[1] R. F. Garcia Ruiz et al., Nature 581, 396–400 (2020)

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