TRIUMF Advanced Rare Isotope Laboratory (ARIEL)

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The Missing Nuclear and Atomic Spectroscopy Enabled in the ARIEL Era via the TITAN-EBIT

Experiments of highly suppressed or forbidden nuclear decays, like double-gamma decay or nuclear excitation by electron capture, require weeks-long setup and observation times in the TITAN-EBIT, which had been curtailed by the over-subscription of the ISAC era. The results of these experiments have far-reaching implications, including direct probes of electric dipole polarizability and the role of spectator electrons in rare HCI decays, which are crucial to nucleosynthesis studies for r-process environments. Moreover, nuclear charge radii, also feasible in the TITAN-EBIT, would provide the first absolute nuclear charge radii for Fr and Ra eEDM hunts and invaluable information about the evolution of nuclear shell structures. Together, these endeavors highlight TITAN's potential to leverage ARIEL's increased beam hours and beam development for innovative and exploratory science.

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