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ARIEL: Driving Scientific Discovery and Innovation with TRIUMF's Advanced Rare Isotope Laboratory

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TRIUMF has embarked on the construction of ARIEL, the Advanced Rare IsotopE Laboratory, with the goal to substantially expand TRIUMF's existing capabilities in rare isotope production and utilization for nuclear physics and astrophysics, materials science and health science.

ARIEL will use proton-induced spallation and electron-driven photo-fission of ISOL targets for the production of short-lived rare isotopes that are delivered to experiments at ISAC.

The first stage of ARIEL, completed on time in 2014, consists of a state-of-the-art 25 MeV, 100 kW superconducting radio-frequency electron linear accelerator and the ARIEL building.

Supported by 19 Canadian universities, ARIEL-II, the next stage of ARIEL, will add new isotope production and delivery systems to begin a broad program of up to 3 simultaneous experiments with a wide variety of exotic isotope species that will significantly increase both the scientific productivity and impact of TRIUMF's rare isotope program. ARIEL-II will develop the next generation of medical isotopes for novel imaging applications and targeted alpha therapy of tumours. In addition, ARIEL-II will further Canadian industry's mastery of SRF accelerator technology, the technology of choice for modern particle accelerators.

The project is organized in five phases designed to interleave science and construction to ensure a continuous stream of scientific results while new capabilities are brought on line.

I will present an overview of the ARIEL project, and discuss the phases, technical challenges, capabilities, science objectives, and timeline.

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