TRIUMF's ARIEL Project

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The primary mission of ARIEL is to deliver unprecedented intensities of rare, short-lived exotic isotopes, and in particular those with extreme neutron excess, to simultaneous and multiple experiments, at the existing and world-leading ISAC accelerator complex.

A secondary mission of ARIEL is to anticipate future uses of e-linac technologies such as free electron lasers, and including commercial uses such as the production of medical isotopes by photo-fission.

ARIEL Phase I - Completion 2015

E-Linac producing 25 MeV, 10 mA. The E-Linac consists of: •a 300 kV e-gun •an injector cryomodule, driven by a 30 kW Inductive Output Tube •an accelerator cryomodule, driven by 250 kW klystron •a beam-line transporting electrons to a temporary

ARIEL Building – Target Hall & Front End



production target

The E-Linac will be built in the Proton Hall (renamed Electron Hall) of the existing Cyclotron building

1) ARIEL Building housing the: Target Hall and Mass Separators •Target Assembly Lab Radiochemistry Labs •Laser Labs •Hot Cells

2) Cryogenics Building housing the Helium refrigeration/liquefier

ARIEL Phase II

•The E-Linac is upgraded to 50 MeV, 10 mA by adding a 2nd accelerator cryo-module •A previously decommissioned Proton Beamline is rebuilt to deliver protons to the Target •2 Mass Separators added after the targets •Beam-line Front End to ISAC Accelerators







Comparison of ARIEL and ISAC Control Systems

	ISAC	ARIEL	Rationale
Control System	EPICS	EPICS	Efficiency of Operator Training, facilitates one control room
Machine Protection		<pre><10 uSec response Uses Beam modes Custom Hardware (JLab)</pre>	500kWatt beam power, 50MeV @ 10mA (Phase II)
High Level Applications	Matlab	XAL	High Power machine will rely on physics models
Control of:			
RF High Power	PLC	PLC and ASYN/Streamdevice RS-232	More control and monitoring parameters
RF Low Level	PC Shared Memory	PC Shared Memory	
Beam Diagnostics	VME and PC Shared Memory	VME and PC Shared Memory	
Beam Optics	CANbus	RS-232, CANbus, Analogue ?	Cabling cost considerations: power supplies are concentrated unlike ISAC where they are distributed
Vacuum	PLC	PLC	
Cryogenics	PLC (Siemens)	PLC (Siemens)	
HVAC	BACnet/EPICS	BACnet/EPICS	

Machine Protection System Block Diagram





http://www.triumf.ca/ariel