

2018 ARIEL Science Workshop: From ARIEL to the Universe

Introductory Remarks

Greg Hackman

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- The "2018 ARIEL Science Workshop: From ARIEL to the Universe" has an overarching goal of reviewing the state of the art of theory, observation, and experiment connected to our place in the universe. It will cover two broad themes.
- The first theme is the origin of heavy elements in the universe, a key element of the future ARIEL science program. This session is motivated by the recent observation through gravity waves of a neutron star merger that produced significant quantities of gold, platinum and other heavy elements. With these new observational realities and with ARIEL science coming soon, this is an appropriate time to review the state-of-the-art in this area.
- The program will consist of invited and contributed talks and discussions that connect the Universe to ARIEL through sessions on neutron stars, kilonovae, and other astrophysical heavy-element nucleosynthesis candidate sites; nucleosynthesis modelling and sensitivity analyses; and, nuclear theory and experiment directions.
- The expected outcome will be enhanced connections between the observations, theories, and experiments that will reveal how the heavy elements came to be, and a clearer perspective on how ARIEL will be able to contribute to this quest.

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- The second theme is "New directions with ARIEL." The session will be dedicated to exploring potential new applications of the ARIEL e-LINAC accelerator beyond the existing programs using exotic ion beams. Examples include searches for new light hidden particles. The expected outcome is a clearer picture of the scientific potential and challenges of such program, and how such a program could move forward.
- This area will also include novel targetry concepts.

ARIEL Science Workshop
July 18, 2018, TRIUMF Auditorium
Schedule

R-Process Sites: 09:00-10:10**Chair: I. Dillmann**

09:00	Introduction	<i>G. Hackman</i>
09:10	Daddy, Where Did I Come From?	<i>J. Heyl</i>
09:40	Neutron Stars and Mergers	<i>C. Horowitz</i>

Coffee Break: 10:10-10:40**R-Process Theory****Chair: J. Holt**

10:40	The R-Processes and their Astrophysical Sites	<i>A. Arcones</i>
11:10	Fission in the R-Process	<i>M. Mumpower</i>
11:40	Onward and Upward: Prospects for applying ab initio methods to the structure of medium-heavy nuclei	<i>R. Stroberg</i>

Lunch Break: 12:10-13:15**R-Process Experiments: 13:15-15:00****Chair: G. Hackman**

13:15	R-Process Sensitivities and Measurements	<i>A. Aprahamian</i>
13:45	Capabilities of ARIEL	<i>A. Garnsworthy</i>
14:15	Opportunities for Nucleosynthesis Studies with TI-STAR and TIGRESS at ARIEL	<i>D. Muecher</i>
14:45	Discussion	<i>G. Hackman</i>

Coffee Break: 15:00-15:30**New Directions for ARIEL****Chair: D. Morrissey**

15:30	Theory of Dark Photons and Dark Sectors	<i>D. McKeen</i>
16:00	Opportunities for Dark Sector Searches with ARIEL	<i>L. Doria</i>
16:30	TRIUMF E-Linac Production of Weakly-Coupled MeV-Mass Particles	<i>J. Behr</i>
17:00	From Nano Materials to Giant Resonances - ARIEL Target Ion Source Opportunities	<i>A. Gottberg</i>
17:30	Discussion and Closeout	<i>G. Hackman</i>

See <https://meetings.triumf.ca/indico/event/29/timetable/#20180718.detailed> for on-line view including descriptions of talks