

D. Karlen - UVic and TRIUMF
UVic Board of Governors Visit
November 27, 2007

Experimental Particle Physics at the University of Victoria

Our research mission

- We perform experiments to answer profound questions about the fundamental laws of the Universe, such as:
 - What makes up normal matter?
 - What holds it together?
 - What gives it mass?
 - Why is there so little anti-matter?
 - What is dark matter and dark energy?
 - a question connecting astro- and particle- physics

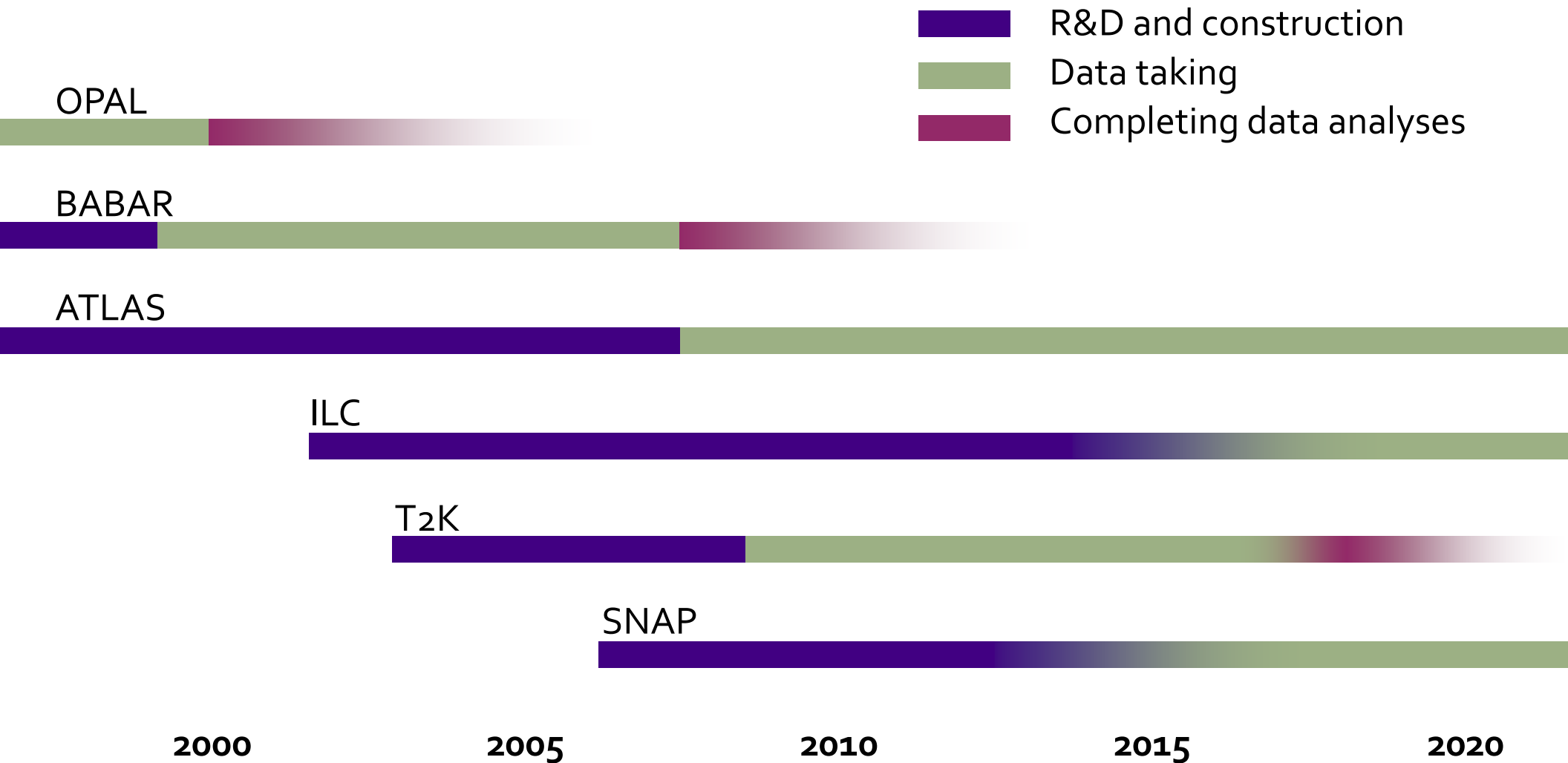
Our research tools

- We use the world's largest scientific instruments to investigate Nature's inner workings:
 - **Particle accelerators** – up to 30 km around – act as powerful microscopes that can resolve features at the scale of 10^{-18} m
 - **Particle detectors** – some weighing as much as 10,000 tons – act as sophisticated digital cameras to capture the images

Challenges

- Building and operating these complex accelerators and detectors require dedicated teams of 100's or 1000's of physicists
 - **long term projects:** more than 10 years per experiment, large international collaborations
 - communication: WWW invented at CERN
 - **need a broad range of skills:** detector design, electronics, programming, analysis
 - excellent technical training for students

EPP Projects at UVic



EPP Faculty activity

Overlapping teams:

	OPAL	BABAR	ATLAS	T2K	ILC	SNAP
Astbury	X		X			
Albert		X	X		X	X
Karlen	X			X	X	
Keeler	X		X			
Kowalewski	X	X	X			
Lefebvre			X			
McPherson	X		X			
Roney	X	X		X		
Sobie	X	X	X			

Facilities for EPP at UVic

- Detector development laboratory
- TRIUMF engineering / design group
- Machine shops (Dept. + TRIUMF)
- Electronics shop (Dept.)
- Computing

Detector development laboratory



TRIUMF engineering / design



Machine shops

recently acquired NC mill for
TRIUMF machine shop



November 27, 2007

Experimental Particle Physics at UVic

Electronics shop



November 27, 2007

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Computing



- developing the next web: grid computing

EPP Leadership at UVic

- The UVic group has a tradition for being leaders in major particle physics experiments around the world
- More information about two of our projects:
 - Presentation: ATLAS at LHC, Switzerland (M.L.)
 - Lab tour: T2K at J-PARC, Japan (D.K.)