

The Canadian Light Source

the nation's brightest light

Jeffrey Cutler, Joel Reid and Toby Bond
Canadian Light Source



Canadian Light Source
Centre canadien de rayonnement synchrotron

THE BRIGHTEST LIGHT IN CANADA



UNIVERSITY OF
SASKATCHEWAN



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At the heart of



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Source

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synchrotron

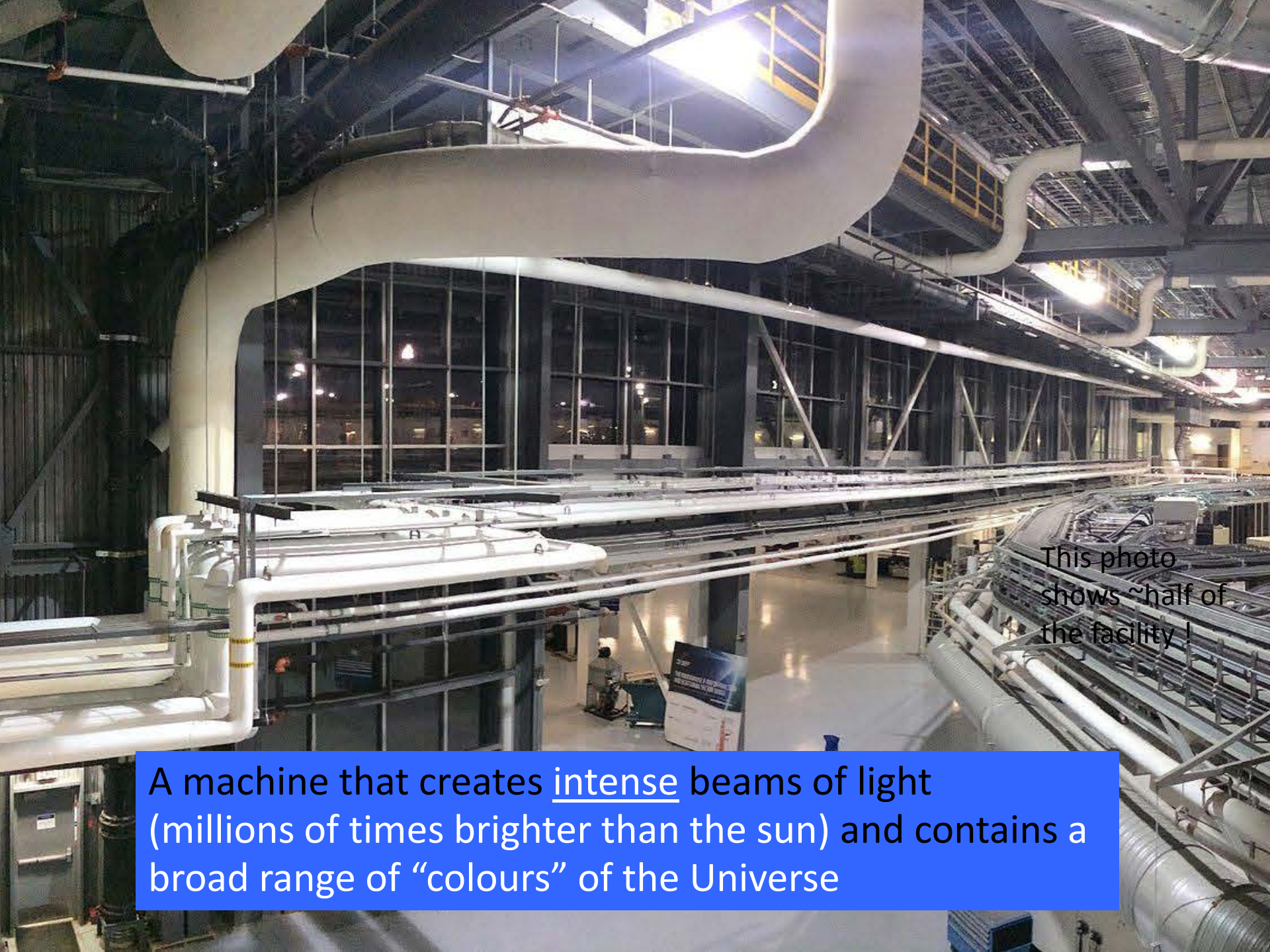
is a synchrotron

A Giant particle accelerator

circled by 21 laboratories

*One of the world's most technically
advanced research facilities –
SCIENTIFIC/TECHNOLOGY ENABLER*

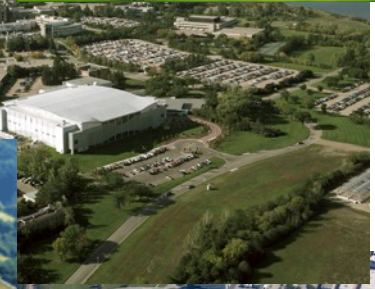




This photo shows ~half of the facility!

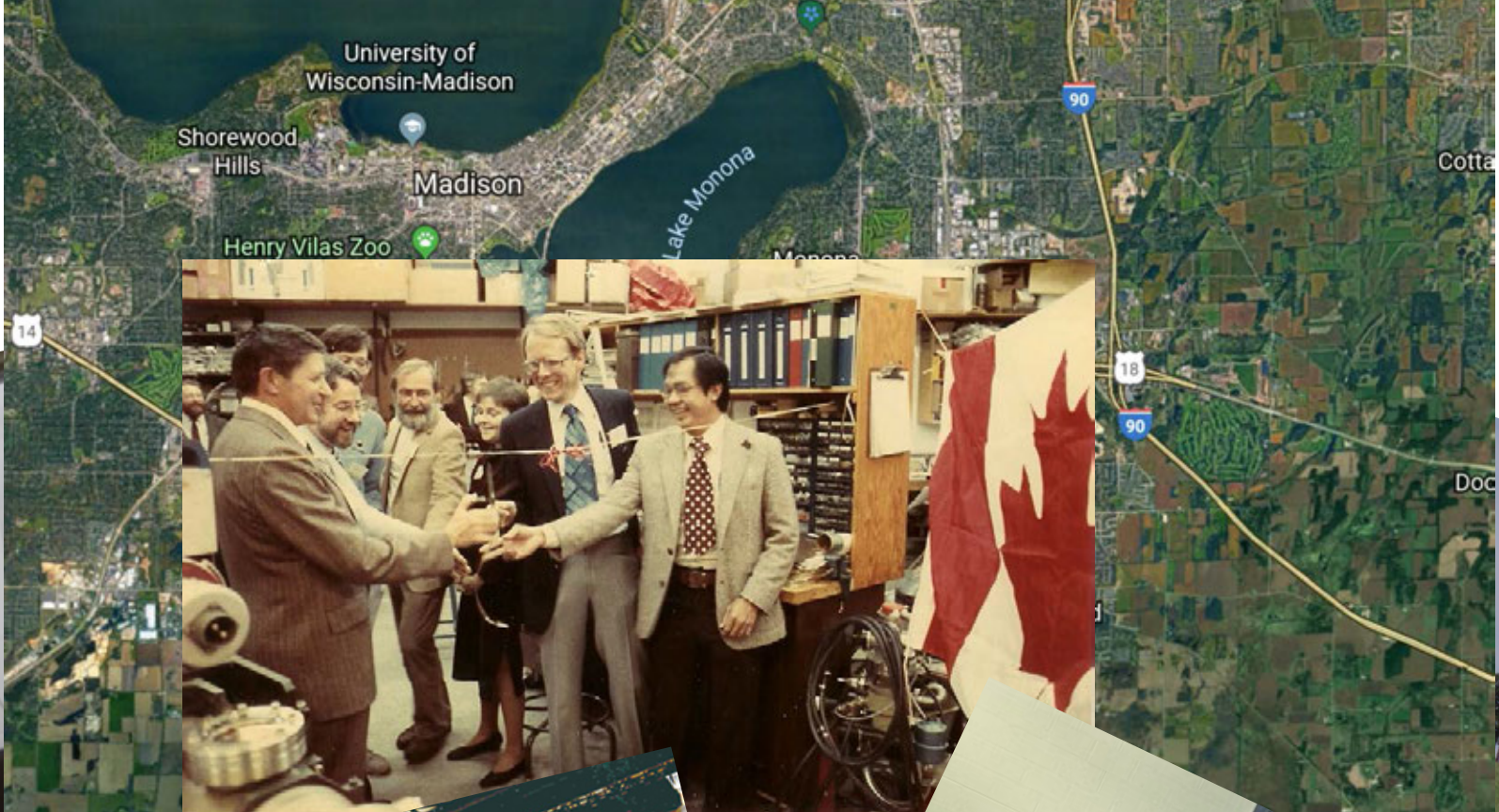
A machine that creates intense beams of light (millions of times brighter than the sun) and contains a broad range of “colours” of the Universe

**WE ARE
NOT
ALONE**



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20 3rd Generation Machines as of 2018

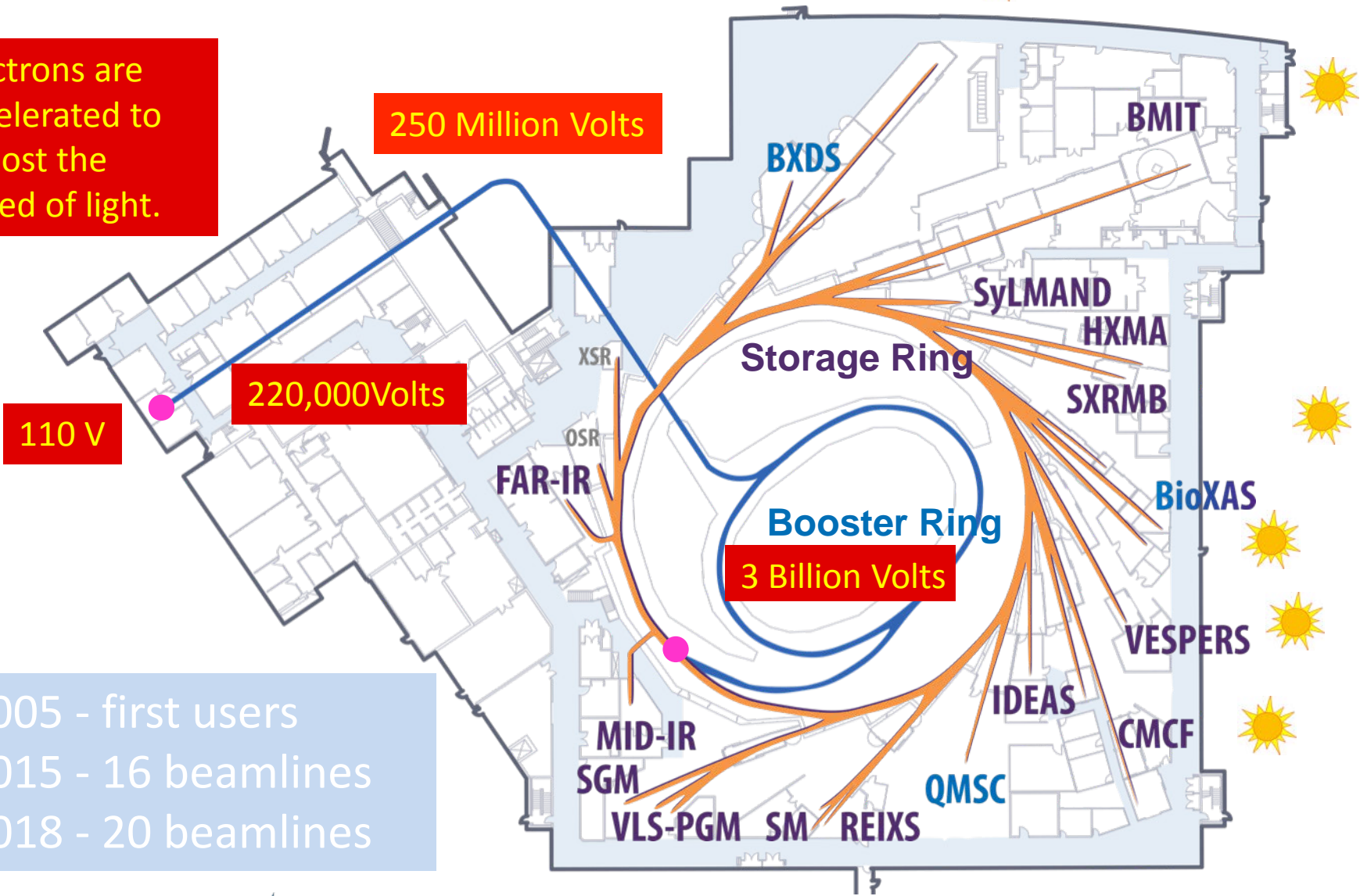


Mike Bancroft giving a
at the 8th synchrotron
Science Laboratory



how does it work ?

Electrons are accelerated to almost the speed of light.

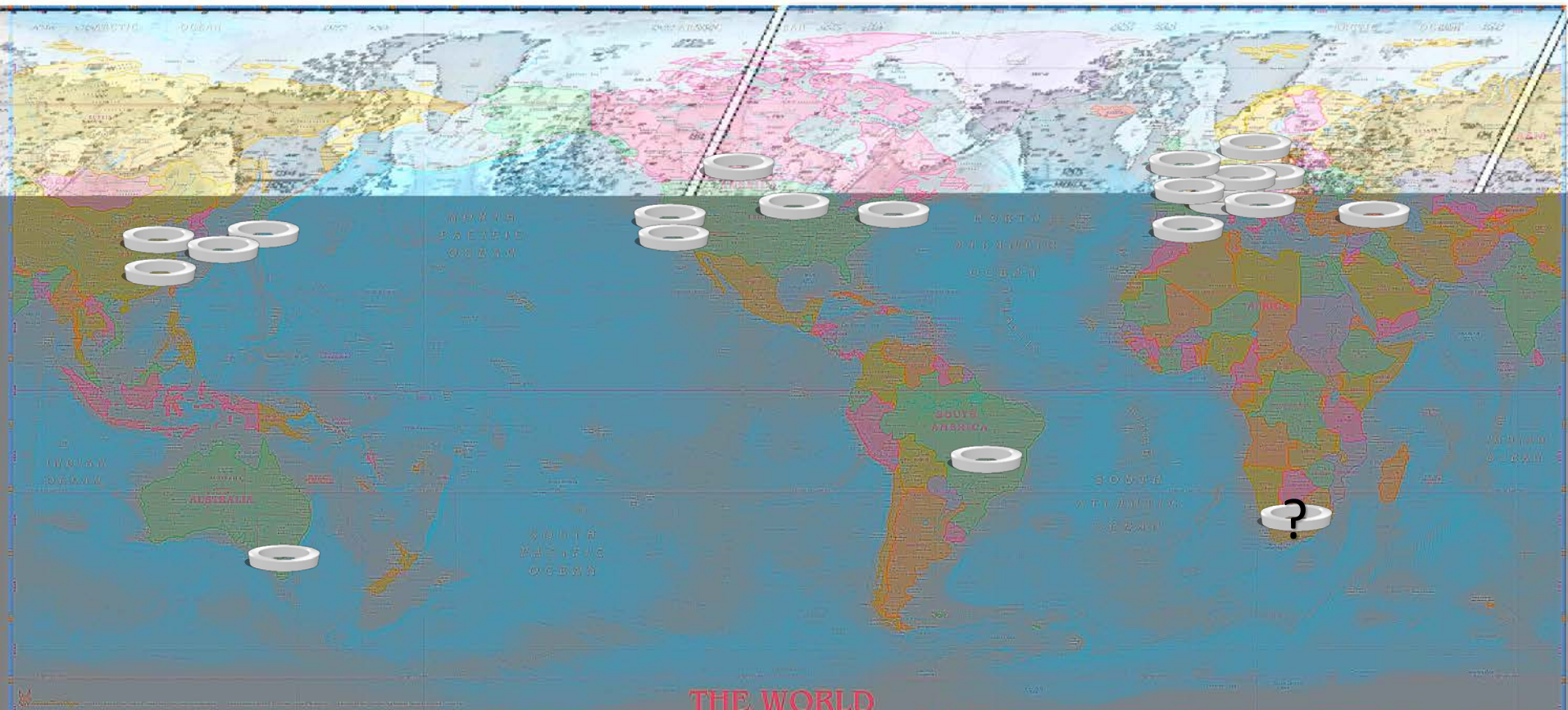


2005 - first users
2015 - 16 beamlines
2018 - 20 beamlines



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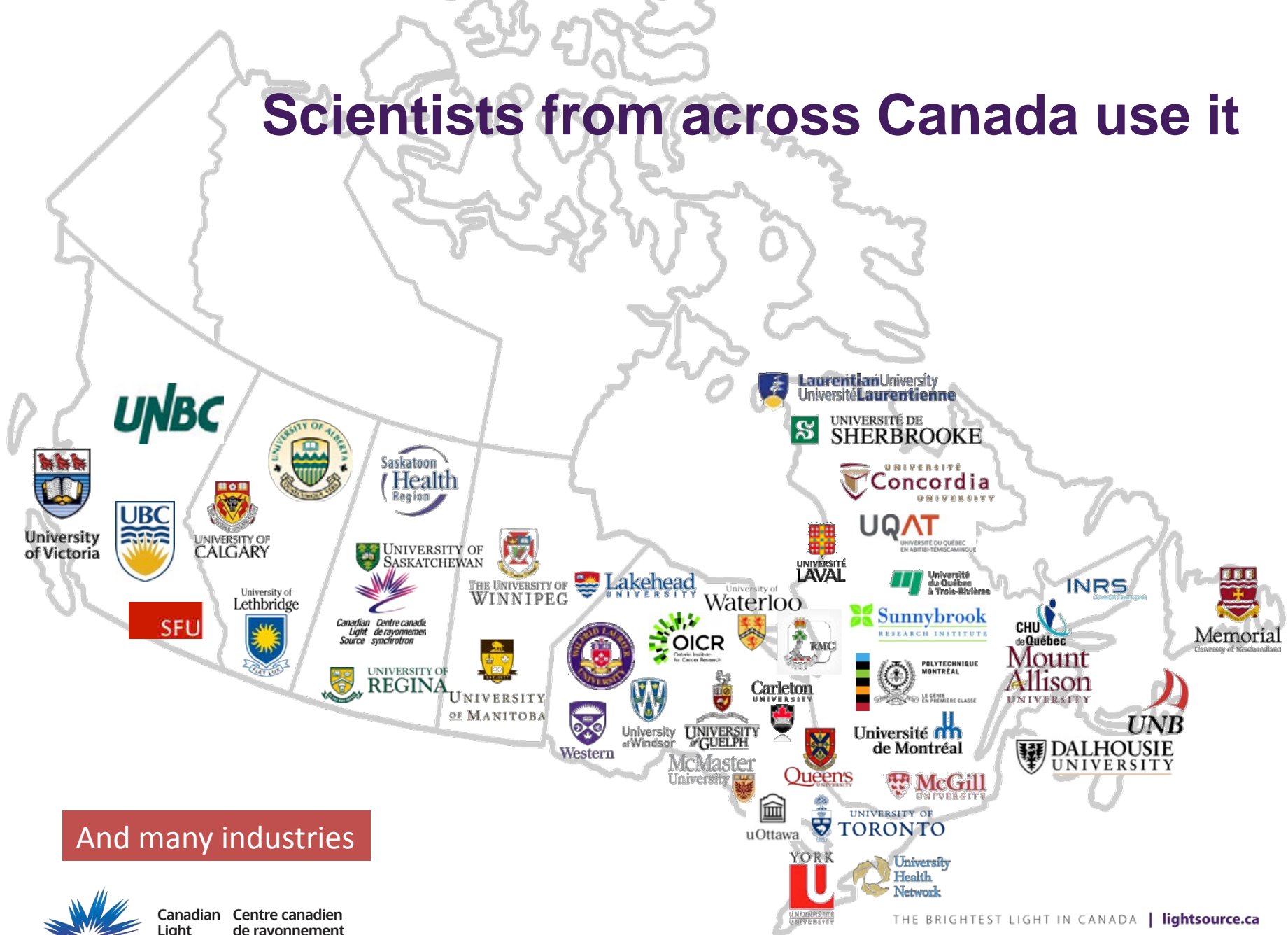
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Scientists from across Canada use it



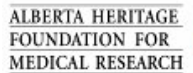
And many industries



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Funding Partners

Western



Operation Funding Partners



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*This is an expensive business
(it's a major National investment)*



~\$ 430,000,000*

**replacement cost in 2018 CAD\$*



\$43 million to operate/year
(~10% of its build cost annually)



In 2017 electricity bill : +\$3 million



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The worlds most perfect light

FLASHLIGHT

*Light that is brighter
than the **SUN**
and containing every
colour from warming
infrared to piercing
ultra hard rays*

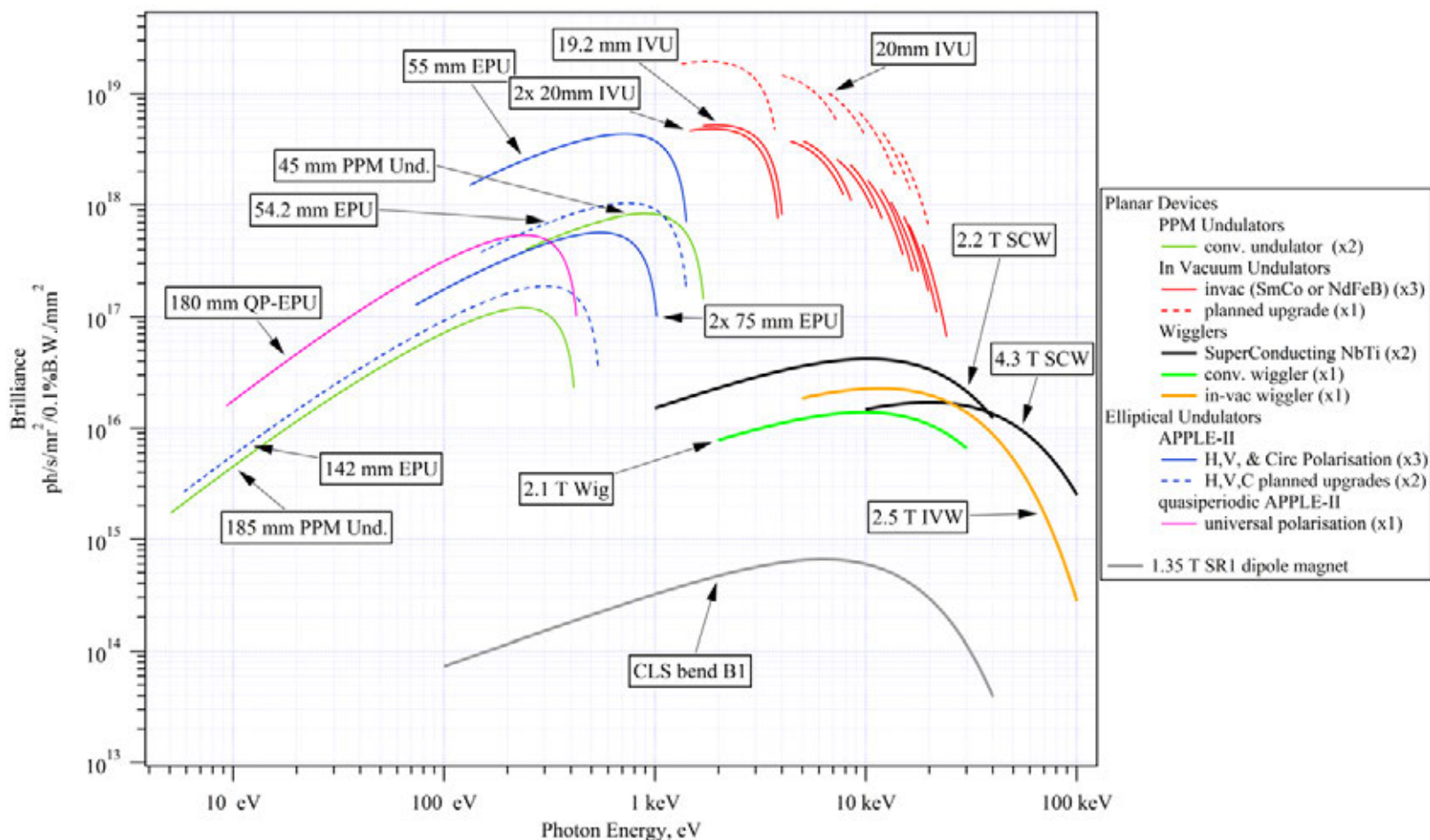
pulsed

*brilliant
polarised
continuous spectrum
collimated*



How Bright is Bright

Brilliance Curves



CANADIAN LIGHT SOURCE INC.

STRATEGIC PLAN | 2017-22

Discovery, Innovation, Solutions

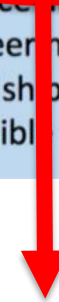


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Objectives

1. Increase impact by being a solution provider
2. Focus research and industry sector activities in areas with the greatest potential
 - Agriculture
 - Health
 - Environment
 - Advanced Materials
3. Enhance and capitalize on machine science and engineering expertise
4. Establish broad awareness of the CLS as an accessible driver of innovation



- **Agriculture***
- **Health**
- **Environment**
- **Advanced Materials**

Access Mechanisms

Peer Reviewed Access	Project Access	First-Come-First-Served Access
<p>Academic self-service</p>	<p>Academic fee-for-service</p>	<p>Purchased Access & Services</p>
<p>Funded by Granting Councils</p>	<p>Funding Sources Reviewed</p>	<p>Fee-For-Service</p>
<p>Costs: Nominal fee, consumables, shipping, travel</p>	<p>Costs: Recovery of some operating and overhead costs</p>	<p>Costs: Access or sample-based pricing dedicated turn-key analysis</p>
<p>Data IP: Academic access 'Intent to Publish'</p>	<p>Data IP: Collaborations intend to selectively publish, (IP & processes in agreements)</p>	<p>Data IP: Fully confidential ; IP owned by industry; up to turn-key services</p>



Shine this light on anything – see more

Pharmaceuticals



New Materials Development



Medical Imaging

Device fabrication



**Minerals
& Mining**



The "swiss army knife" of scientific research



Agriculture



Aerospace



**Cell structures &
disease**

**Surfaces
& Coatings**



Clean Technologies

Created **167** years ago on silvered copper plates



2018



Looking back through time

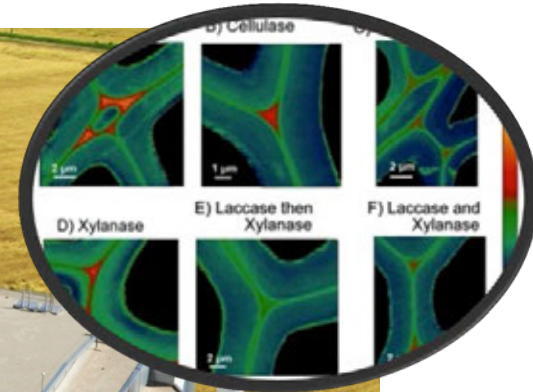
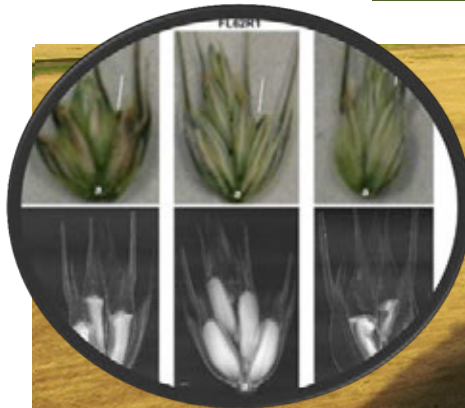


2018

the first commercially successful photographic process (1839-1860) and those pictures are back.

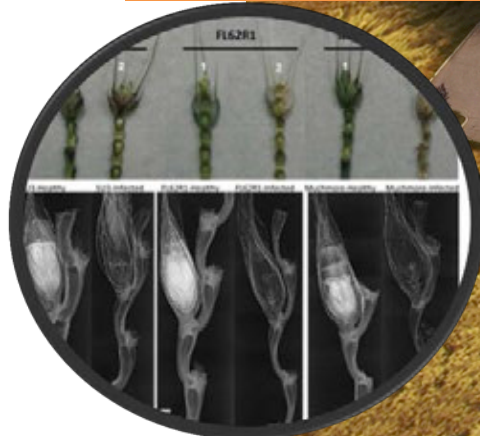


Science at the CLS - tuning to Location



2016 : UoS Global Food Security Programme (Canada First Research Excellence centre)

2018 : Agriculture and Agri-Food Canada
(new CLS Board member, more time allocated to Ag programmes)



Apply HEALTH → AGRICULTUREbecause plants get sick too

Speakers



Jeff Cutler – Executive Officer

- Material science
- X-ray Photoelectron Spectroscopy



Joel Reid – Industrial Staff Scientist

- Powder Diffraction
- Crystallography
- Spectroscopy



Toby Bond – Industrial Scientist

- Energy storage research
- X-ray Imaging



Discussion

