



Diamond Light Source Introduction and Overview

**Andy Dent
Physical Science Coordinator
Diamond Light Source Ltd**



Diamond Light Source

Sited on Harwell Science and Innovation Campus

Largest scientific facility to built in the UK for over 40 years.

Opened for operations in January 2007

Phase I:

7 beamlines - 2007

Phase II:

+ 15 beamlines to be completed by 2012

Phase III:

**+ 10 beamlines:
approved, first 5 in design, 5 more under consideration**



Diamond Layout

100 MeV Linac

3 GeV Booster

C = 158.4 m

3 GeV Storage Ring

C = 562.6 m

Experimental Hall
and Beamlines

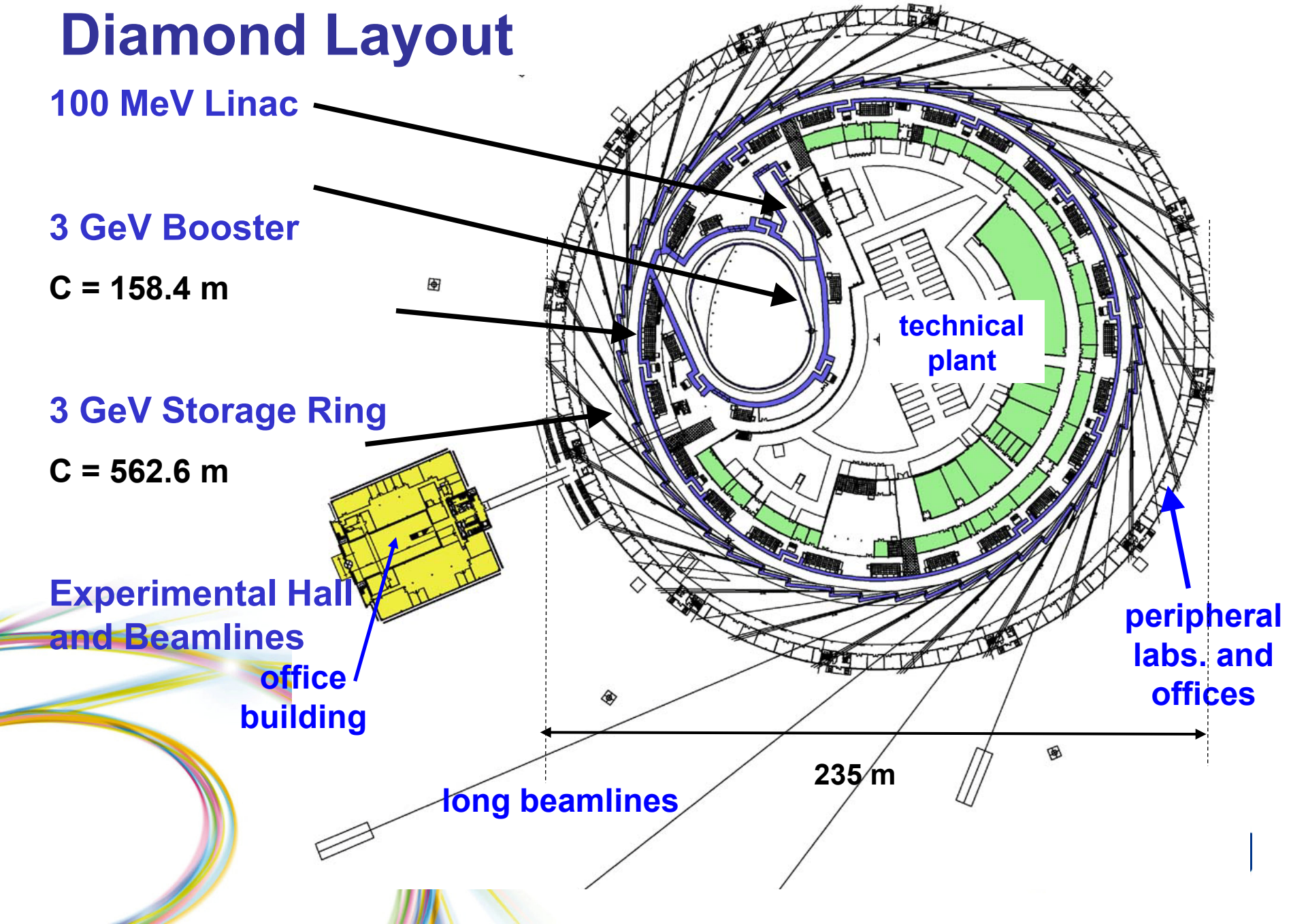
office
building

technical
plant

peripheral
labs. and
offices

long beamlines

235 m



Machine Stats

Energy	3 GeV	
Beam current	300 mA 250 mA	<i>Spec</i> <i>User Mode</i>
σ_x	122.9 μm	
σ_y	6.4 μm	
$\sigma_{x'}$	24.2 μrad	
$\sigma_{y'}$	4.2 μrad	
Emittance		
- horizontal	2.7 nm rad	
- vertical	4-50 pm rad	<i>~ 27 pm in User Mode</i>
Lifetime at 300 mA	~ 18 h	<i>but now operate top-up</i>
Min. ID gap	5 mm	<i>User Mode, depending on ID</i>
Stability	2.5% (H), 7.5% (V)	<i>No feedback</i>
<i>of beam size</i>	0.5% (H), 1.7% (V)	<i>Feedback, 1-100 Hz</i>
<i>and divergence</i>		

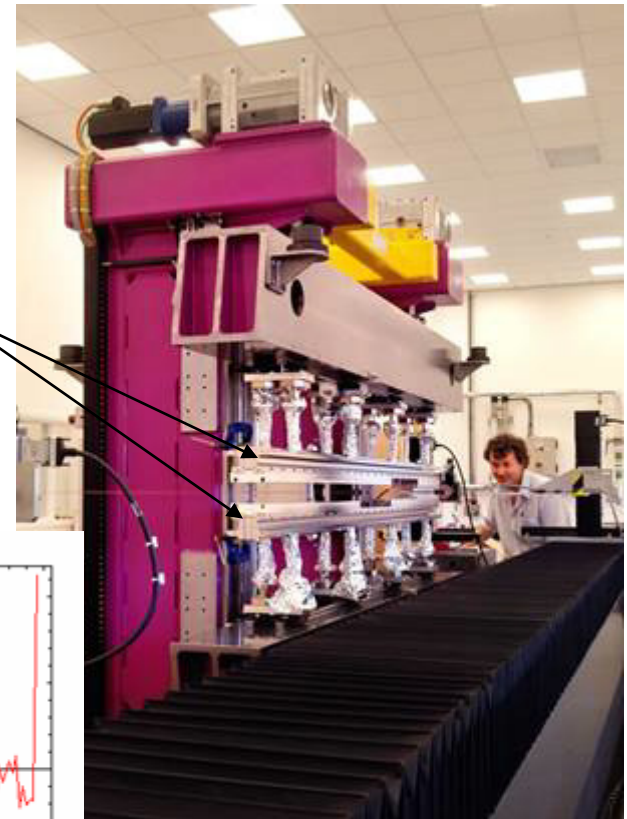
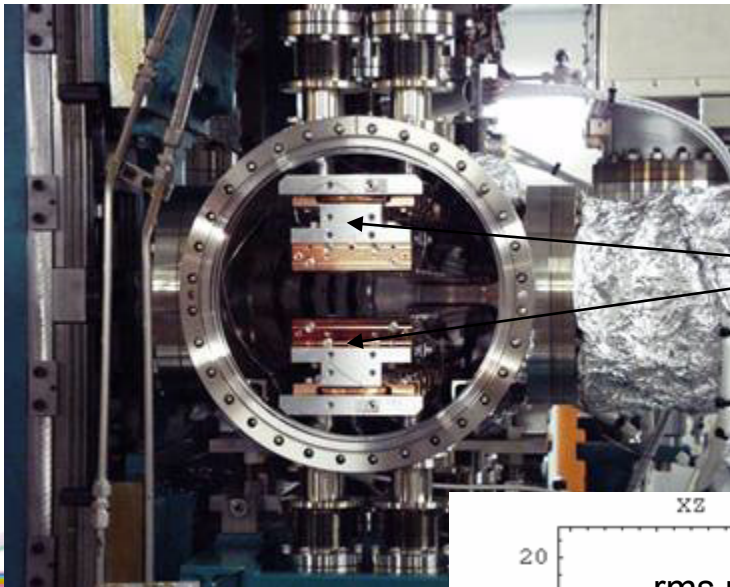
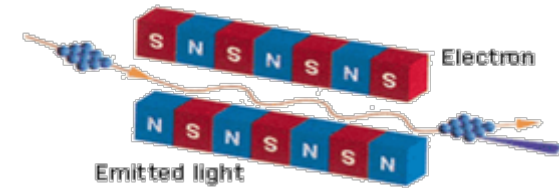
Storage Ring



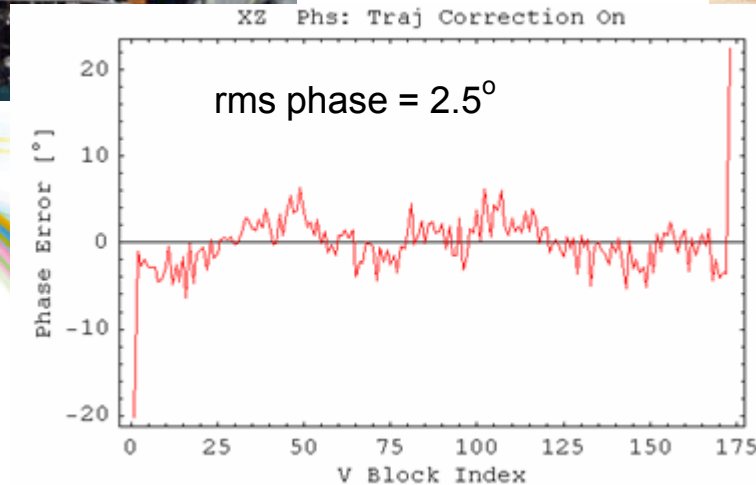
In-vacuum Undulators

6 out of the first 8 beamlines use in-vacuum undulators (unique for a new facility).

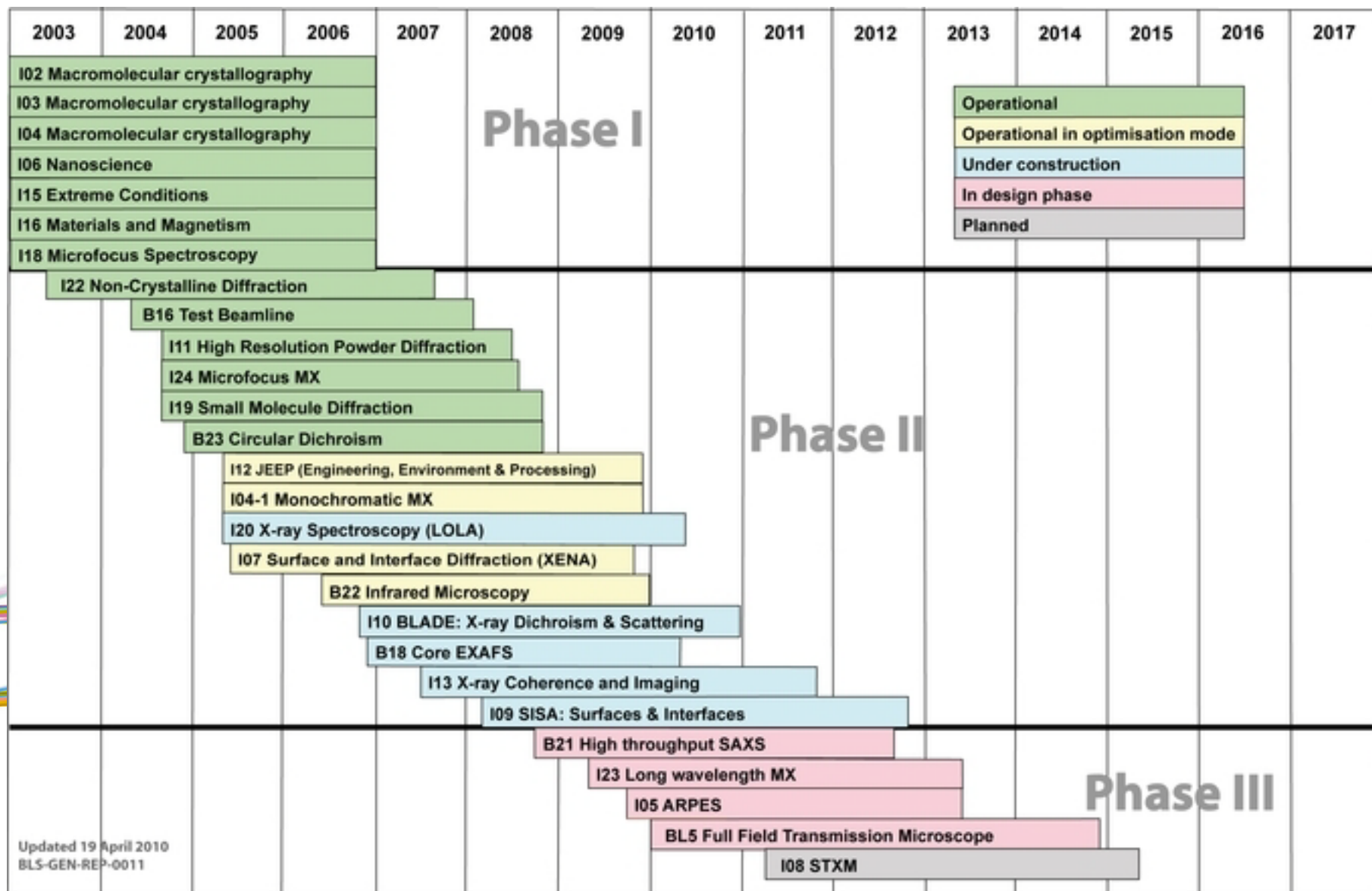
The state-of-the-art undulators are being developed in-house.



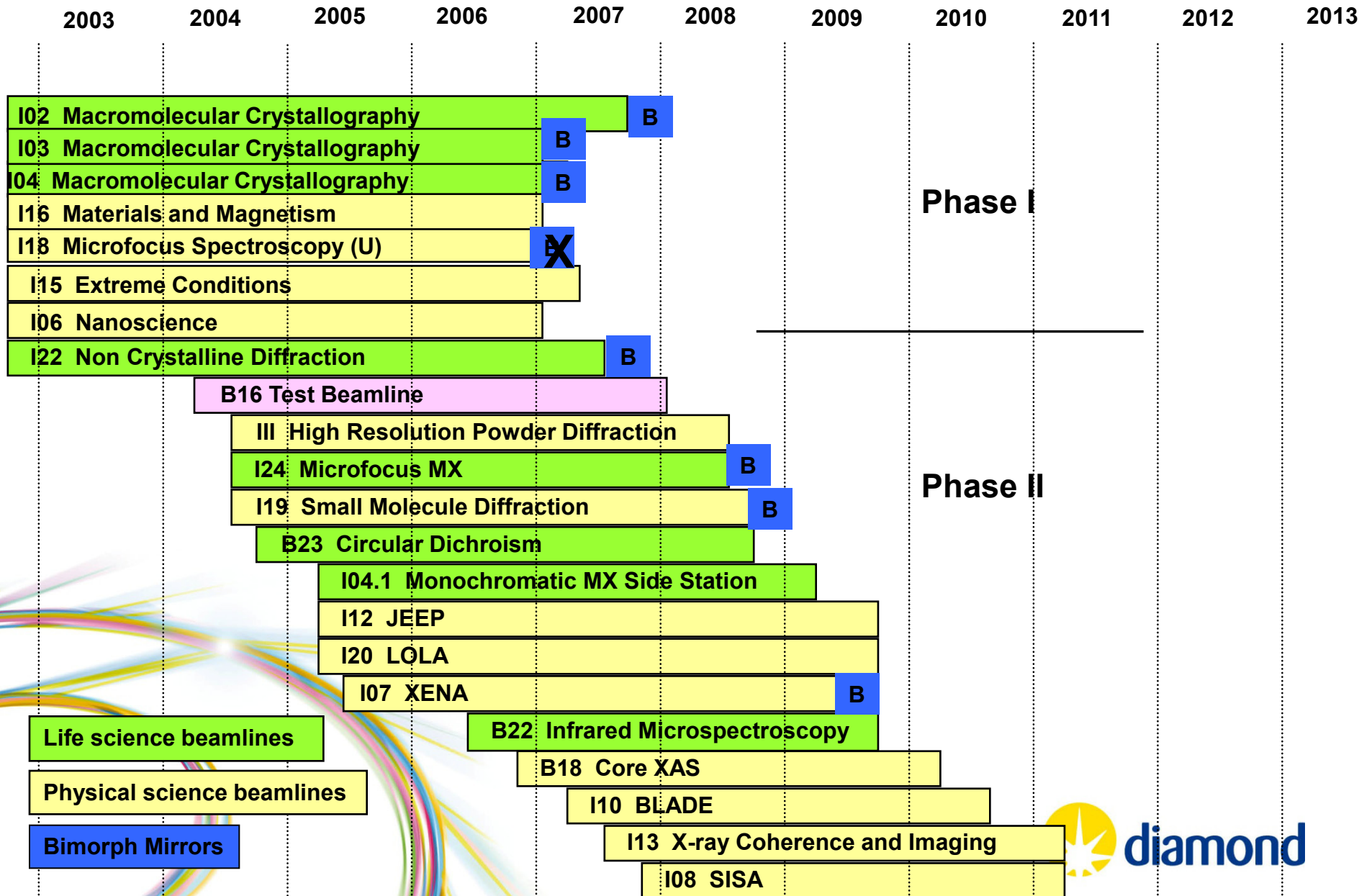
magnetic arrays

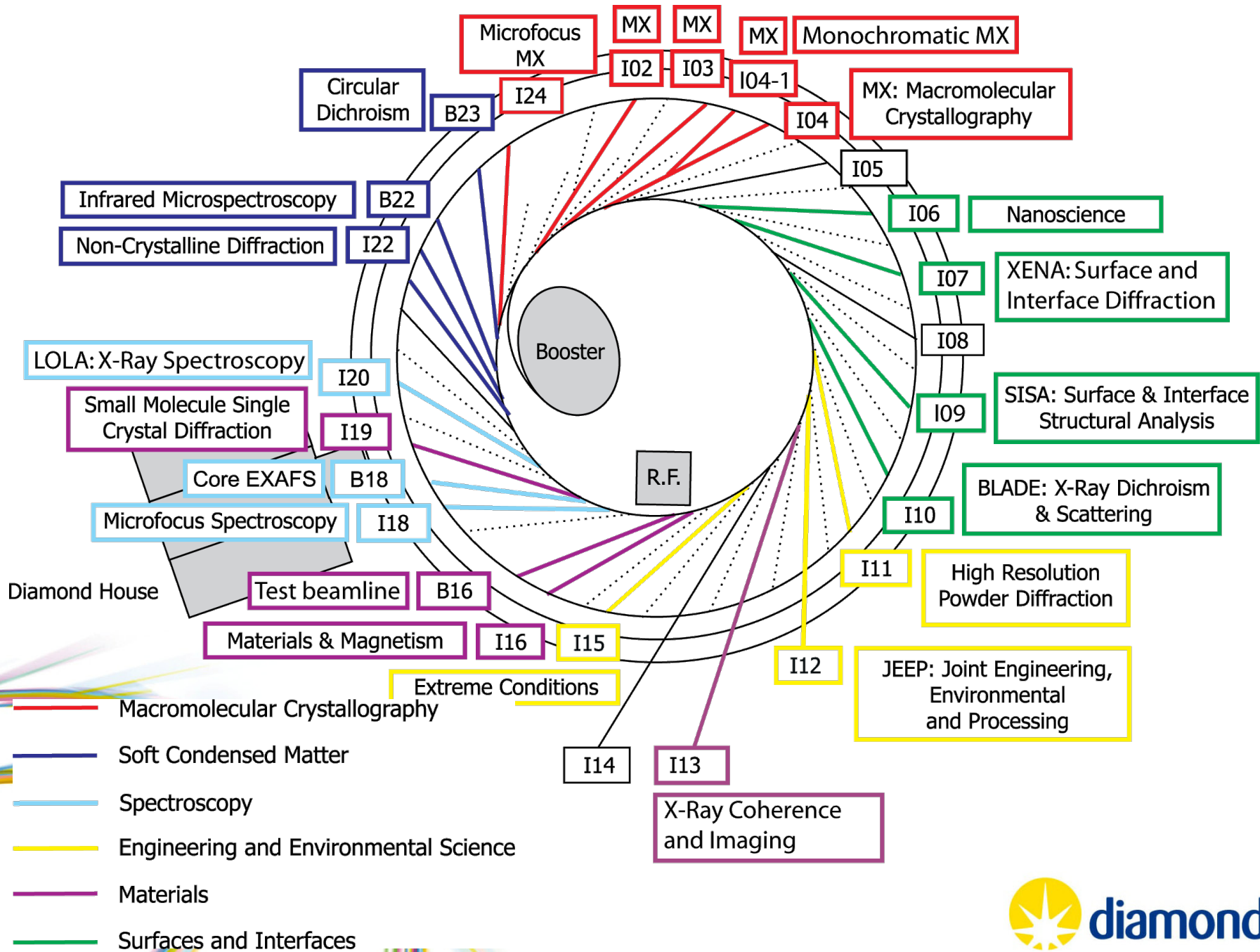


Beamline Programme



Beamline Programme







Thank you and enjoy the workshop

