

Diamond Light Source vacuum systems: the first four years of user operations

MP Cox, Diamond Light Source Ltd, Harwell Science and Innovation Campus, Didcot, Oxfordshire OX11 0DE, UK

Diamond Light Source is the UK's national 3rd generation synchrotron light source comprising a 3 GeV 562 m circumference electron storage ring fed by a 158 m circumference booster ring and a 100 MeV Linac. User operations started in January 2007.

The main vacuum vessels are constructed from 316LN stainless steel, pumped by discrete noble diode ion pumps supported by non-evaporable getters and titanium sublimation pumps in critical areas. Operating pressure in the storage ring is 5×10^{-10} mbar with 250 mA stored current. As of May 2011, 20 user beamlines are operational and 13 in-vacuum undulators (including one cryogenically cooled) are installed along with 2 superconducting multipole wigglers and 3 ex-vacuum insertion devices with NEG-coated vessels.

The presentation will give a brief overview of Diamond's vacuum systems including vacuum pumping and instrumentation design, vessel manufacturing, processing, construction, installation and commissioning. It will go on to cover the operational performance of the vacuum systems, practical experience from the first four years of user operations and future upgrade plans.