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Fully NEG-coated vacuum system design for the storage ring of Iranian Light Source Facility

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The Iranian Light Source Facility (ILSF) is a 4th-generation synchrotron radiation facility currently in the design phase, featuring a storage ring with a circumference of 528 meters. The lattice of the 3GeV storage ring is based on a compact multi-bend achromat (MBA) lattice and has a nominal horizontal emittance equal to 270 pm.rad. The vacuum system for the ILSF storage ring is designed with Non-Evaporable Getter (NEG)-coated vacuum chambers to ensure optimal performance. These chambers are constructed from copper tubes with an inner diameter of 26 mm and a wall thickness of 1 mm. To manage the heat generated by synchrotron radiation, a water-cooled copper pipe with an inner diameter of 3.18 mm is integrated into the vacuum chambers. The total coated surface area in one super period of ILSF is about 2.45 m^2 , while the surface area of the uncoated parts, primarily connections for ion pumps, is about 0.16 m^2 (6% of the total surface area). Based on the pressure profile simulations, only 6 ion pumps with 20 l/s pumping speed will be sufficient to provide the desired pressure along one super period of ILSF (26.4 m length).

Footnotes

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