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The vacuum system design of the RF cavity section in the storage ring of the Iranian Light Source Facility

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The Iranian Light Source Facility (ILSF) is a 3 GeV synchrotron light source designed to serve as a cutting-edge tool for scientific research, providing high-brightness X-rays for a wide range of applications. In the booster ring, particles are accelerated to a final energy of 3 GeV and then stored in a storage ring with a maximum beam current of 400 mA.
The RF cavity is a fundamental component of synchrotron light sources, playing a critical role in ensuring optimal machine performance. Optimizing the operational characteristics of the RF cavity significantly enhances the quality of the emitted radiation. The conceptual design of the RF cavity system of storage ring for ILSF to meet these requirements consisting of three 100 MHz main cavities plus two 300 MHz for bunch lengthening. A Monte Carlo simulation was conducted using Molflow and Synrad to calculate the pressure profile along the RF cavity straight of the ILSF. The results indicate that three diode ion pumps, each with a pumping speed of 300 l/s for 100 MHz, and two diode ion pumps, each with a pumping speed of 75 l/s for 300 MHz, will be necessary to achieve the desired pressure in the ultra-high vacuum regime.

Footnotes

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