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Vacuum system for Wuhan Advanced Light Source storage ring

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The main accelerator of WALs (Wuhan Advanced Light Source) is a 1.5 GeV, 180 m storage ring with emittance 222.8 pm.rad, which reaches soft X-Ray diffraction limit. To achieve such low emittance, the magnet system is designed very compact with very small aperture. And this results in a narrow transition structure and a low flow conductivity vacuum chamber. In consideration of the beam lifetime, the vacuum system requires the average static and dynamic pressures to be better than 5×10^{-10} Torr and 1×10^{-9} Torr, respectively. And the distributed pumping and proper absorption of synchrotron radiation load are required. In this paper, oxygen-free high-conductivity copper (OFHC) is used as the main material of storage ring vacuum chamber. And the radiation load in the storage ring was solved by providing water along the illuminate of synchrotron radiation surface and area. The Non-evaporation getter (NEG) coating provides a distributed pumping which can be acquired by vacuum magnetron sputtering plating, significantly reduce the cost and complexity of storage ring vacuum system construction.

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Primary authors: WEI, Geng (Wuhan University); LI, HaoHu (Wuhan University); WANG, Hongjuan (Wuhan University); LI, Hui (Wuhan University); LI, Jian (Wuhan University); HE, Jianhua (Wuhan University); WANG, Jike (Wuhan University); ZHANG, Jingmin (Wuhan University); XIANG, Pai (Wuhan University); HAO, Xuerui (Wuhan University); Dr ZOU, Ye (Wuhan University); WANG, Yong (Wuhan University); ZHANG, Yu Xin (Wuhan University); CHEN, Yuan (Wuhan University); Dr NIE, Yuancun (Wuhan University); XU, Yuhai (Shanghai Institute of Applied Physics)

Presenter: WEI, Geng (Wuhan University)

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