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TECHNICAL CHALLENGES IN BATCH COATING AND PERFORMANCE TESTING OF NEG FILMS FOR THE HALF VACUUM SYSTEM

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The Hefei Advanced Light Facility (HALF) is a fourth-generation synchrotron radiation facility operating at 2.2 GeV, with a storage ring circumference of 480 meters. The traditional lumped vacuum pumping scheme is insufficient to maintain the required vacuum environment due to space constraints and limited flow conductance in small-aperture vacuum chambers, a practical solution to these challenges is the deposition of non-evaporable getter (NEG) films on the inner walls of the vacuum chambers. In the HALF storage ring, the coated vacuum chambers account for 81% of the total length, covering approximately 500 chambers. Completing high-quality coatings for all chambers within a limited timeframe presents a significant challenge. To address these challenges, a specialized equipment for batch coating of vacuum chambers has been designed and built. In this paper, the batch coating equipment and the technical challenges encountered during the coating process are discussed, as well as film thickness profile simulations for racetrack-shaped vacuum chambers. Additionally, the performance testing of the coated films, including vacuum characteristics and pumping properties, is also examined.

Footnotes

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Author: XU, Xiaopeng (University of Science and Technology of China)

Co-authors: JIN, Xinyu (University of Science and Technology of China); GUO, Tao (University of Science and Technology of China); MA, Wenjing (University of Science and Technology of China); ZHOU, XueSong (University of Science and Technology of China); WANG, jinghua (University of Science and Technology of China); XING, Junke (University of Science and Technology of China); FAN, Le (University of Science and Technology of China); HONG, Yuanzhi (University of Science and Technology of China); DONG, Shaoxiang (University of Science and Technology of China); WANG, Sihui (University of Science and Technology of China)

Presenter: DONG, Shaoxiang (University of Science and Technology of China)

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