

Vacuum system with turbomolecular pumps for high-power proton beam operation of the rapid cycling synchrotron

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This presentation reports the improved vacuum system for the high-power beam operation in the rapid cycling synchrotron (RCS) from two perspectives: (1) Improved turbo molecular pump (TMP) system to prevent the failure caused by the high-intensity beam loss and (2) establishment of the pressure runaway suppression method through an understanding of the dynamic pressure mechanism. We describe the failure event of the TMP caused by the high-intensity beam loss. The countermeasure against such TMP failure is explained. We also describe the pressure runaway during the highpower beam operation. Then, the dynamic pressure mechanism is verified by comparing the measurement with the analytic calculation. The critical parameters for the pressure runaway are also elucidated by the calculation. Finally, we describe the effect of the additional NEG pumps to suppress the pressure runaway.

Summary

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