

Operational Experiences of NEG Dominated Pumping System at CHESS-U

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Successful operations of the Cornell High Energy Synchrotron Source Upgrade (CHESS-U) have proven the in-service reliability of the compact non-evaporable getter (NEG) pumps in a new experimental vacuum system predominantly pumped with distributed NEG-strips and modular high-capacity NEG pumps. The 80-meter section improvement in the Cornell Electron Storage Ring (CESR) is composed of 6 double-bend achromats operating with a single positron beam up to 200 mA. After a successful commissioning period, a vacuum level of 10^{-9} Torr was achieved with minimal maintenance and NEG re-activations.

The CHESS-U vacuum system experienced a catastrophic failure when a beam steering error created a pinhole leak in an undulator vacuum chamber (0.6-mm wall). The installed NEG-dominated pumping system had demonstrated an adequate pumping performance, which allowed a quick recovery and reconditioning of the affected 20+ meter vacuum section. With the hard work of the technical staff, X-ray user operations were able to resume after 10 days of recovery efforts (chamber fabrication and replacement, vacuum conditioning). The accidental air-exposure to the NexTorr pumps (combination of ion pump and NEG) resulted in minor Argon instability issues that required mitigation. Corrective actions were developed in areas such as thermal monitoring, chamber construction, and beam steering while also granting the opportunity to test the pumping integrity of the effected NEG pumps after the exposure.

The 3-year operational experiences of the NEG pumping system will be presented.

Summary

Primary authors: ABOHARB, Leila (Cornell University); LI, Yulin (Cornell University)

Presenter: ABOHARB, Leila (Cornell University)

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