
Contribution ID: **161** Type: **Poster**

# Vacuum System Model and Measurements at New H+ RFQ Ion Beam Injector

A Radio Frequency Quadrupole (RFQ) accelerator is being developed to replace the H+ Cockcroft-Walton (CW) injector. The injector upgrade will significantly reduce the long term operational risks and improve existing LANSCE beam production for the Isotope Production Facility and future 800 MeV proton beam user systems [1].
In this study, we evaluate the vacuum model of the new RFQ injector system. Vacuum components, hydrogen gas injection system and low energy beam transport line for new H+ ion beam injector at 201.25 MHz RFQ accelerator were assembled and tested. We will present first vacuum pressure measurements and compare them with simplified high vacuum system model. We will discuss: a) optimization of the vacuum pressures inside a duoplasmatron ion source versus various hydrogen gas mass flow rates, b) high voltage extraction chamber vacuum conditions for different vacuum pumping speed configurations, c) proton beam current attenuation for high injection of hydrogen gas and d) maximal voltage limits in the three electrode extraction column.

[1] R. Garnett, Y. Batygin, C. Chapman, I. Draganic, C. Fortgang, S. Kurennoy, R. McCrady, J. O'Hara, L. Rybarcyk, H. Salazar, B. Koubek, A. Schempp, J. Haeuser "LANSCE H+ RFQ Status"6th International Particle Accelerator Conference IPAC2015, Richmond, VA, USA, (2015), p. 4073-4075.

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**Session Classification:** Poster Session 1

**Track Classification:** Key Technologies for Ion Sources