

Computer controlled gas system for the H⁻ and ECR ion sources

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We have developed a computer-controlled gas system for the ion sources at the Cyclotron Institute which will minimize the effort and error when changing gases. A prototype has been built and is currently ready for on-line testing with the H⁻ ion source. The prototype was designed specifically for the H⁻ ion source to control hydrogen and deuterium gases only but can be easily expanded to control multiple gases for the ECR ion sources. For convenience and portability, the gas bottles, computer, control equipment and gas valves are all assembled together on a single rack with wheels (Fig. 1). A rack-mounted Supermicro computer running Windows 7 acts as the main control server for the gas system. The software control program was built using LabVIEW 2012 and monitors hardware status and responds to user commands. For added convenience, a client software module was developed for any other computer on the network and will remotely control the gas system over Transmission Control Protocol (TCP) communication. Fig. 1 (right) shows the front panel of the client module which looks and operates exactly as the master control program. There is no limit to the number of clients that can be connected to the main server at the same time, and the main control server will broadcast any system changes to all clients that are connected. Additionally, the control system can be set to local control mode for quick on-site operation by a manual switch at the control rack. Then once switched back to remote control mode, the software control program will automatically update the system status and gain sole control of the system. An expanded gas control system for ECR2 will be developed after the on-line test of the prototype system for the H⁻ ion source has been completed.

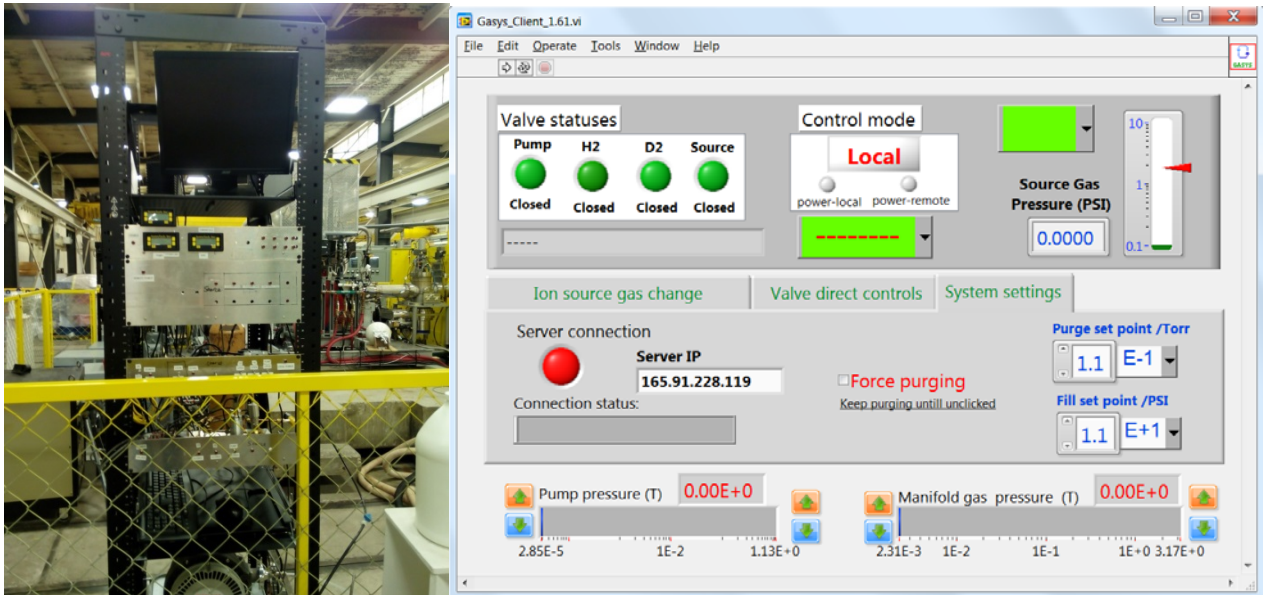


FIG. 1. Left – Front view of the prototype computer controlled gas system. Right – The control client front panel (user interface) of the gas control system.