Qt Based Control System Software for Low Energy Accelerator Facility

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Low Energy Accelerating Facility (LEAF) is a 50 keV DC electrostatic accelerator operational at Van de Graaff building at Bhabha Atomic Research Centre, Trombay, Mumbai.[1] LEAF can accelerate various beams across periodic table. A sputtered negative ion source generates negative ions which are accelerated using high voltage. For this purpose entire ion source floats at negative high voltage (typically – 50 kV). Extracted ion beams are bend by a 90 degree magnet which acts as mass analyzer and selects desired mass to deliver at target. Ion currents delivered at target is micro amperes of particle current for prolific beams such as C- or H- and for difficult beams such as Li- , delivered current at target is few hundred nano amperes. This accelerator has already delivered negative ion beams of Hydrogen, Lithium, Carbon, Sulphur, Tellurium, Gold, and Silver etc. This accelerator is used for various experiments in material science and atomic physics studies using ion clusters.

Control System Features

- Client Server model of control.
- Two servers , one is floating at negative 50 kV, collect field data and apply control signal to field devices.
- Operator interface acts as client and connect both the servers, to receive field data and to send control signal, via LAN using connection oriented TCP/IP protocol.
- Analog and digital field data is acquired from the field and control signal is applied to power supplies via NI 6008 , a microcontroller based USB powered low cost DAQ.
- Both client and server is written in Qt 4.7 , working in windows OS.

Architecture , Scan Cycles & Operator Interface