

Cooling System

Preface

The Vacuum system when fully operational becomes a rather massive heat load.
The thermal budget breaks down as follows:

- Cryopump helium system: 2.5kW
- Bell Jar during Vaporization: <5kW
- E-Beam Source: ~2-10kW

Issues with current setup:

- Improvised, not designed as well as it should.
- Poor controllability, only one loop for all systems.
 - This may not be a bad thing, but as of now the Helium compressor is in parallel with the rest of the system, causing a cooling imbalance.
- No Proper Reservoir, the system suffers severely from trapped air bubbles.
- BIG ONE: The current reservoir pump has a Pressure Reservoir, this coupled with the flow restrictions in the system allows ~6L of water to be stored as a pressurized holdoff, that releases when the system turns off.
 - This MUST be removed, it is one of the reasons for the air inclusion, pressure issues and recent water leak. It also takes up large amounts of space.
- No flow metering. We have rotary flow meters with electronic readout available, they should be included.
- No Proper temperature readouts.
- BIG ONE: Insufficient fan pressure to cool the radiator properly.
 - Stronger fans must be used.