

Musing on Cryogenic Segmentation

- Large Systems : LHC, ILC, SSC
 - System is expected to run uninterrupted for a long time.
 - Warming any part of it up stops the experiment impacting the work of large numbers of people
 - Cost of segmentation can be very high (a valve box every 100 m for a 30 km system adds up)
 - Solution tends to be limited segmentation with great care paid to proper design, prototype testing and QA

- Small Systems: bench top
 - Generally R&D systems with many changes over time and many warm ups and cool downs expected
 - May be too small to segment but if not ability to warm up sections of it may be worth the cost.
- Medium Systems: Jlab, SNS, TRIUMF, XFEL, FRIB, Project X
 - These systems contain aspects of both small and large systems
 - The segmentation solution is not as straightforward

Things to Consider

- Will parts of Project X arrive at different times & will cooling them down independently be of value?
- Trading flexibility vs. cost, complexity and reliability
- Impact of thermal cycling on cavities, seals, sensors and other components
- Difference between vacuum segmenting and cryosegmenting
- Differing lab cultures