

# PIP-II linac cryogenic distribution system design challenges

*Thursday 29 August 2024 16:00 (2 hours)*

The PIP-II linac cryogenic distribution system (CDS) is characterized by extremely small heat inflows and robust mechanical design. It consists of a distribution valve box (DVB), intermediate transfer line, tunnel transfer line comprising 25 bayonet cans, and ends with a turnaround can. Multiple helium streams, each characterized by distinct helium parameters, flow through each of these elements. The CDS geometry allows maintaining an acceptable pressure drop for each helium stream, considering the planned flows and helium parameters in different operation modes. This is particularly crucial for the return line of helium vapors, which return from the CDS to the cold compressors and thus have very restrictive pressure drop requirements. On both sides of the DVB there are fixed supports for process pipes. One of the design challenges was to route the process pipes in such a way that their shape provided sufficient compensation for thermal shrinkage. This ensures that the forces resulting from thermal shrinkage acting on the cryogenic valves remain at a level acceptable to the manufacturer. The required thermal budget of the CDS was achieved by thermo-mechanical optimization of its components, like process pipes fixed supports in bayonet cans.

## Footnotes

## Funding Agency

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**Session Classification:** Thursday Poster Session

**Track Classification:** MC4: Technology: MC4.2 Cryomodules and cryogenics