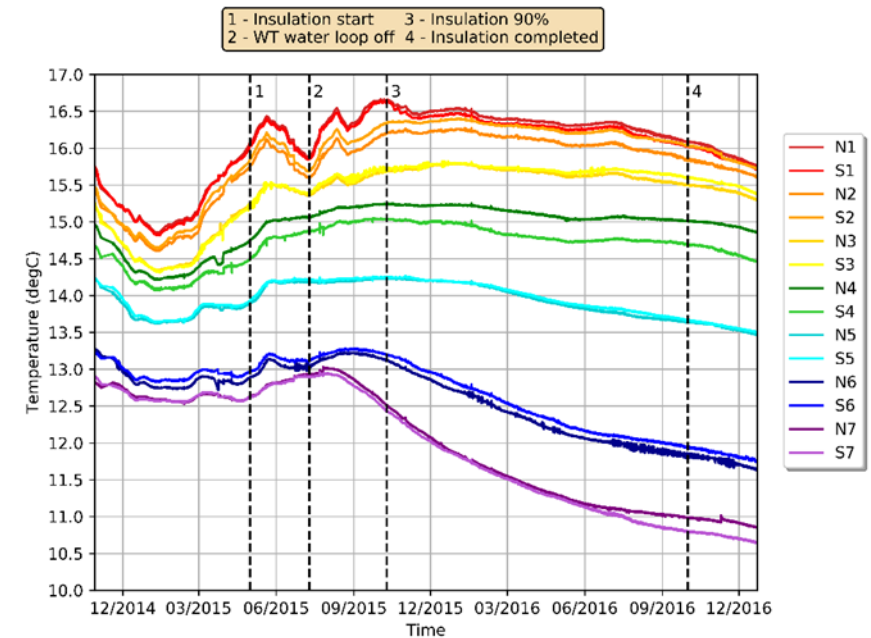
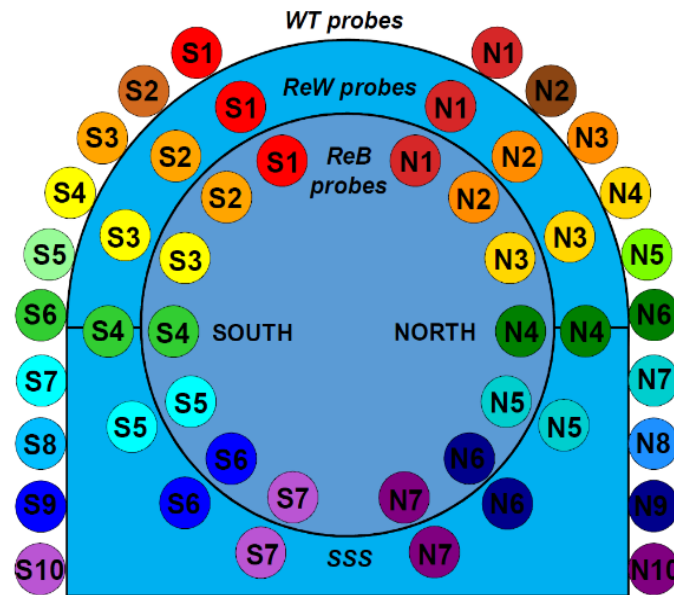
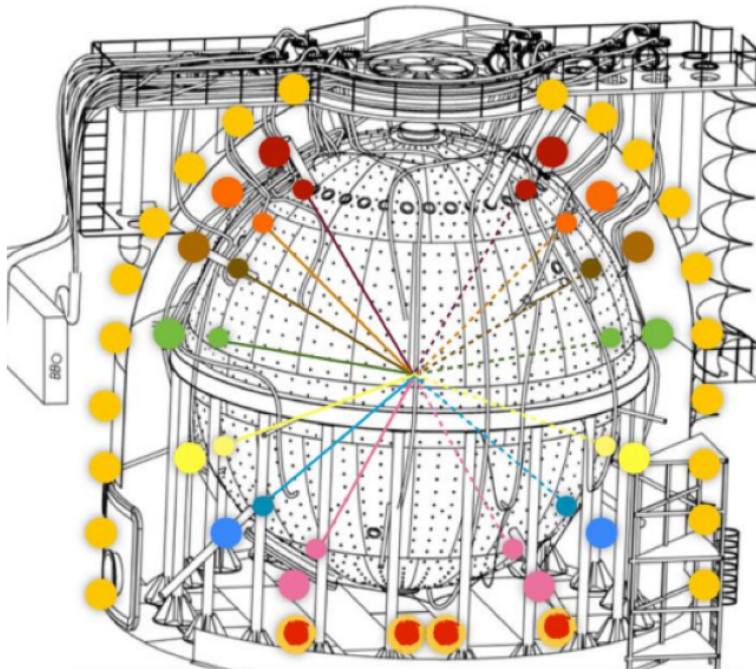


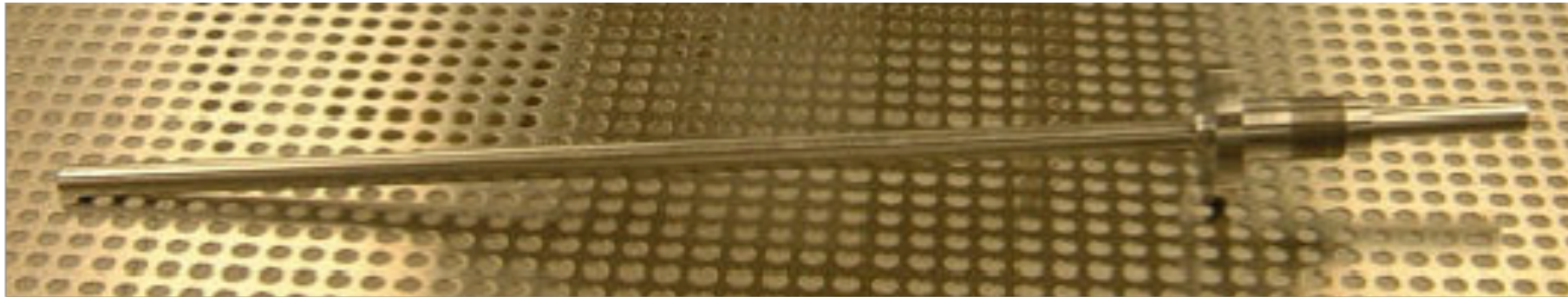
# Borexino External Source (Thermal Probe) Insertion System (S1-7, N1-7 are through the SS sphere and are all in a plane)

originally for intense gamma sources (used once),  
later repurposed to thermal probes

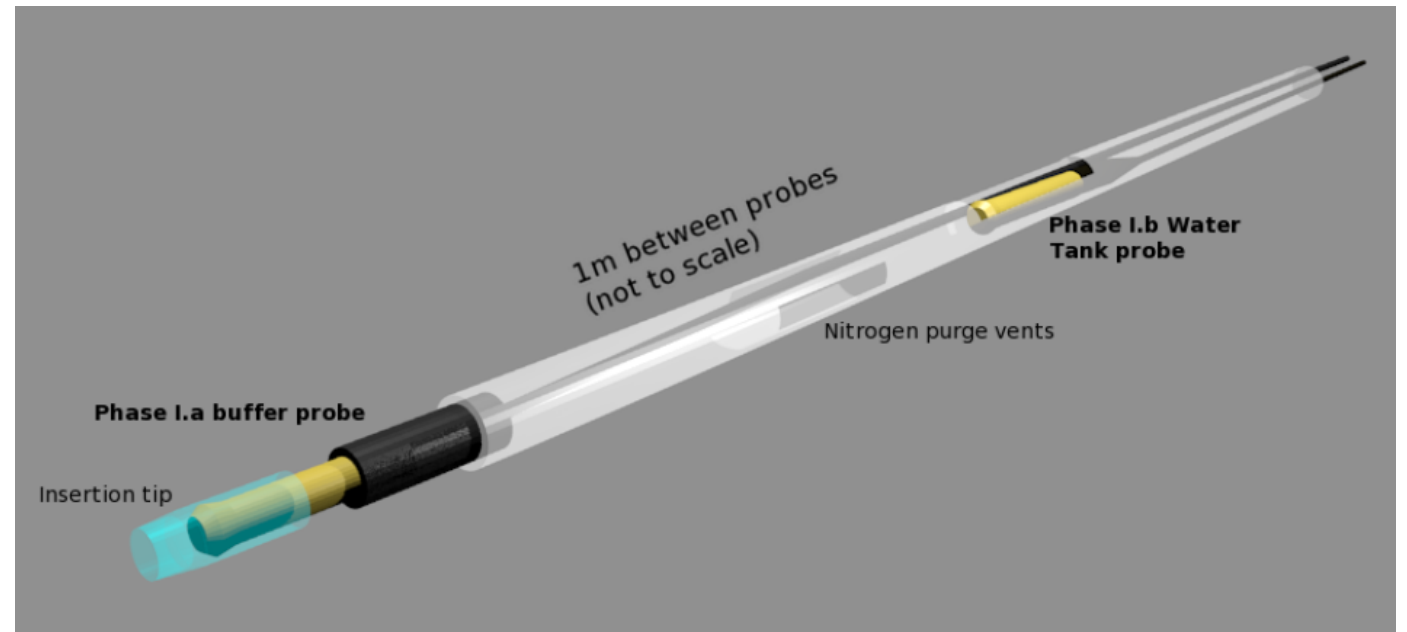
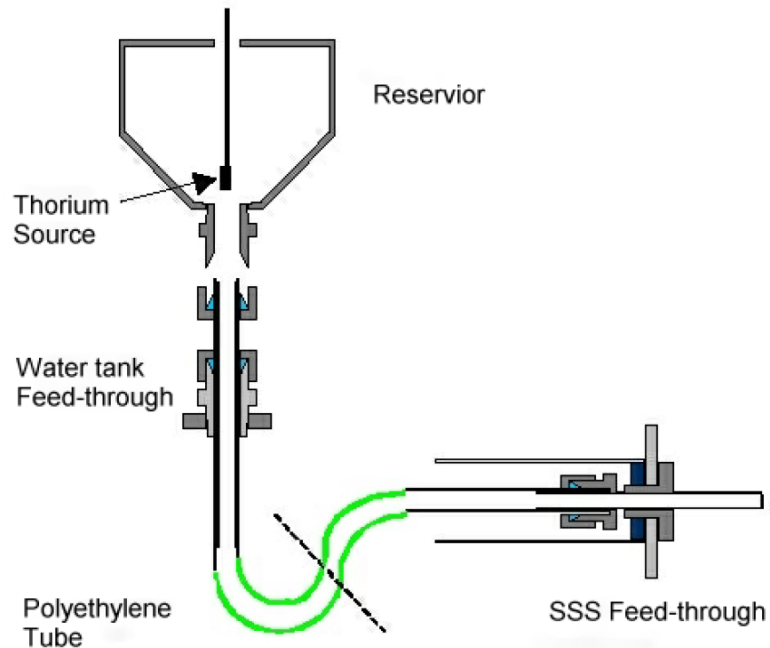
- ReB probes (OB)      ● WT probes (ext WT)
- ReW probes (int WT)   ● Icarus Pit probes



# Reentrant Penetration through SS Sphere

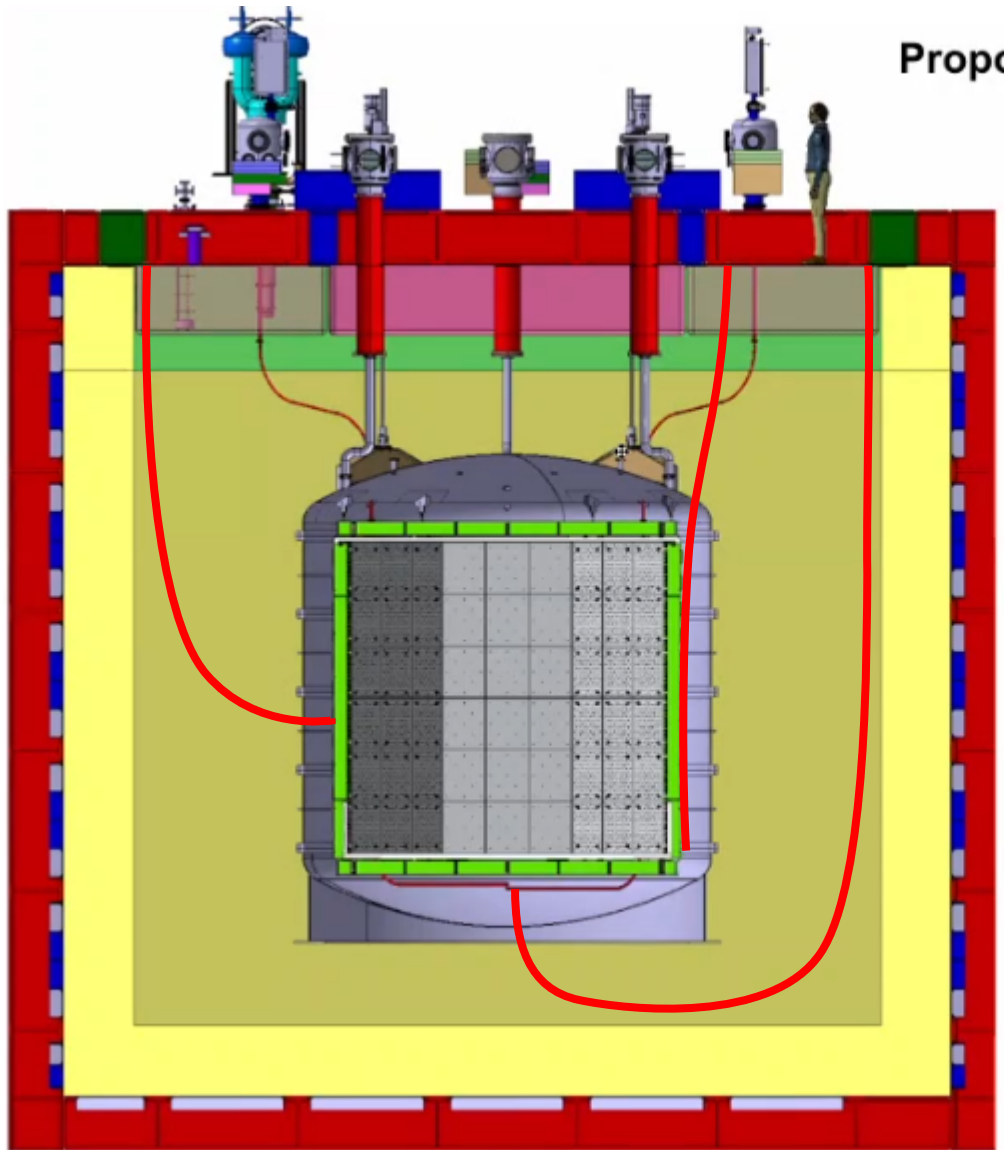


HDPE tube attached to this end and runs to top of water tank



Two probes each allowed continuous temperature measurement both in the water tank and in the outer buffer.

# Possibilities for DarkSide



Three example tubes are shown in the diagram (red lines)

(does **not** replace internal short-lived calibration sources)

The sources could be fed into tubes and enter the Titanium vessel and approach the TPC using similar re-entrant pipes.

Advantages:

- larger radius of curvature
- less blockage of veto region

Disadvantages:

- cryogenic complications
- shield void region if left empty
- extra ports on Ti vessel (but no mixing with UAr)
- fewer deployment locations near surface of TPC