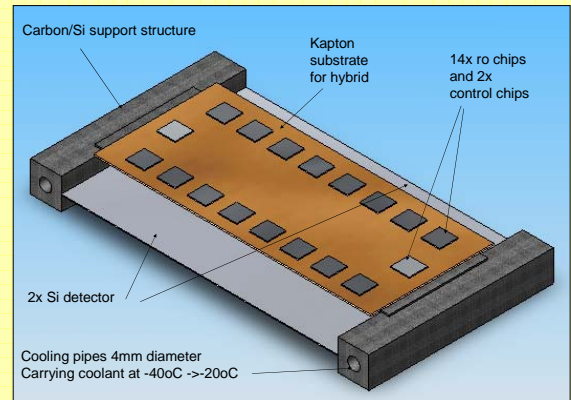
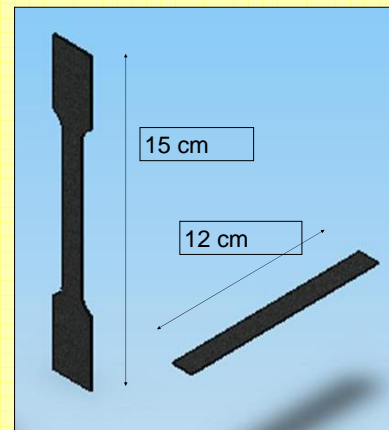


Development of Supermodule Structures

- For the slhc si tracker upgrade Glasgow contribute
 - mechanical design
 - thermal design and
 - prototyping of the structures
- design studies made using FEA (ANSYS) of different designs
- based on different support materials E.g. Carbon fibre, CSiC, SiC, Ceramic
- to evaluate thermal & mechanical behaviour of the prototypes
 - thermal studies will look at the heat flow from the modules to the cooling fluid
 - aim of optimizing the sensor temperature
 - then the mechanical properties of the resulting can be studied
- Process of building prototypes to investigate the engineering feasibility of the best designs for a given material
- In the first instance we want to look at a CSiC
 - This material has been developed for lightweight mirror and space applications
 - Manufacture “green bodies” from various carbon fibre type materials
 - Infiltrate with Si by gas or liquid
 - Good combination of mechanical and thermal properties
 - Being investigated for telescope and spacecraft engineering
- Prototypes will be evaluated in the laboratory to benchmark the FEA studies using dummy modules to provide a realistic heat load



Conceptual Module: (3D CAD model)



CSiC Samples (XYCARB) Tension & Thermal

Vacuum chamber with 16 octal feed through service for thermocouple readout.

Two 4 input NI thermocouple data acquisition modules.

Copper cooling block with cooling service connections.

Computer controlled chiller using high performance coolant.

PC interface with labview, DAQmx and chiller control Software.

16 PT 100 precision thermocouples

High performance woven matrix heating element.

Experimental layout

Detailed layout of the experiment