# Cooling for the GEM modules with sALTRO16

- Purpose of the new modules
- Proposed cooling system for SALTRO
- Tests needed

### Purpose of the module

- Test of technical aspects
  - New GEM support
  - integrated electronics
  - cooling system
  - SALTRO with/without power pulsing
- Performance (resolution) of the detector has already been demonstrated
  - We don't need many channels

### 25 MCM boards =200 SALTRO chips =3200 channels



#### **Reduced space**



# Cooling with 2phase CO2 via heat conducting plates





### **TPG/TC1050**

- Highly heat conducting material (~3 times Cu)
- Anisotropic: conducting in 2D
- sandwiched with Al for better mechanical properties





### **Proposed layout**



### Tests planned

TC1050 cooling performance



- Need material samples, might take a couple months
- TC1050 electrical properties
  - Would the plate spread noise
  - small TPG/TC1050 samples are in DESY
  - preliminary tests can be done soon with packaged chips

## To Do

- More simulation
- Proper layout, pipes routing
- Solutions for thermal contacts