IJCLab positrons source
Preparing MAMI 2022 campaign
Amorph target temp measurement setups

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Outline

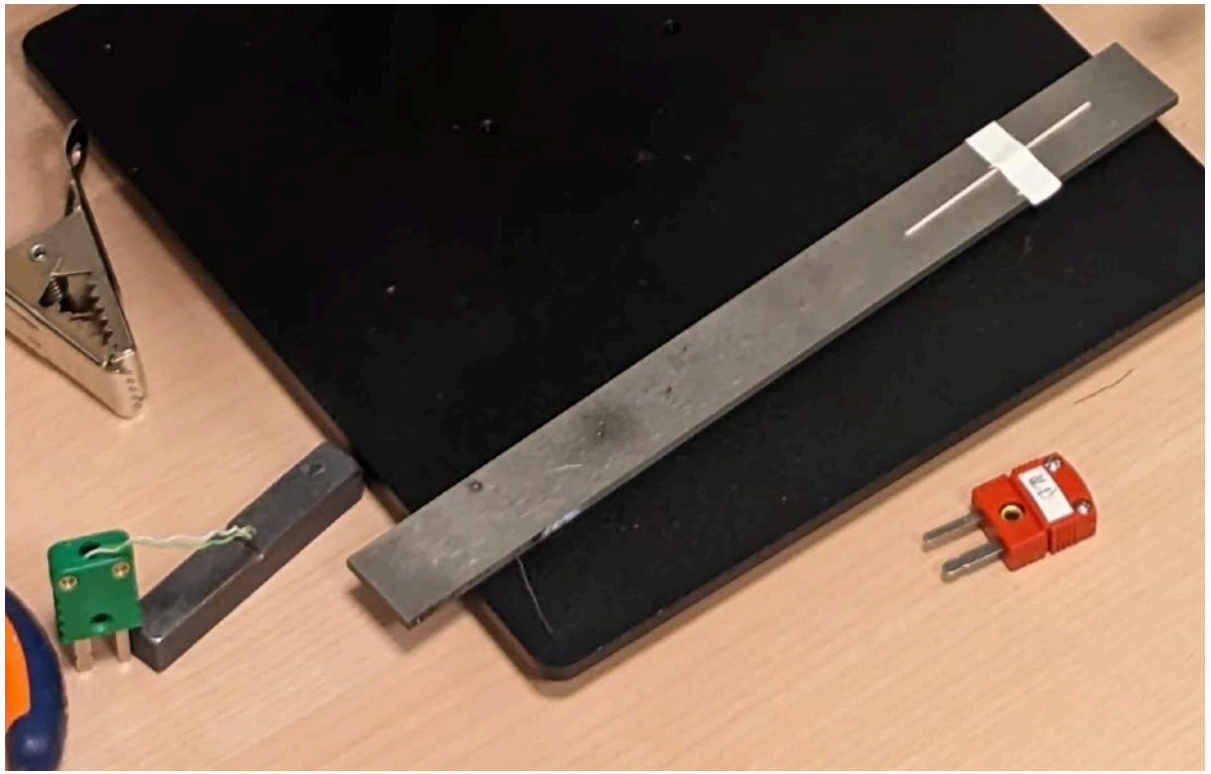
1. (Micro) thermocouple welder setup and misc.
2. Thermocouple types and welding trial / manufacturing status
3. Target material and size
4. Target setup : design, measurement points configuration, mounting

(Micro) thermocouple welder setup and misc.

- Arc welder
- Digital microscope
- 3d-axis linear stage with conductive wire holder (clamp)
- Mini drill with X-Y linear stage and scratch tool (W carbide and diamond scratch bit) —> for engraving (V-groove crosshair for positioning thanks MAMi movers / camera during shifts ; crosshair for thermocouple positioning)

Thermocouple types and welding trial / manufacturing status

- W target :
  - WRe6/WRe25 wires welding onto target ; some success, mainly fails (lead : welding with inert gas to be tested at IJCLab's worshop / rent a Argon bottle + buy a pressure regulator / flowmeter [what about storage, air venting])
  - K type thermocouple : one of the 2 wires has a good "sticking" (to be tested : weld 2nd wire… on first ! Good candidate for temp meas at target brim; i.e. diameter) ; Warning : max temp 800 ° C (see oxydation)
- Other target material : welding tests to be done ; prior the material delivery, K type pipette to be manufacture (back up solution… or likely the go to solution)
- Scratch tools :
  - used manually on W flat bar : it works
  - 3D printed interface part done ; to be mounted on mini drill



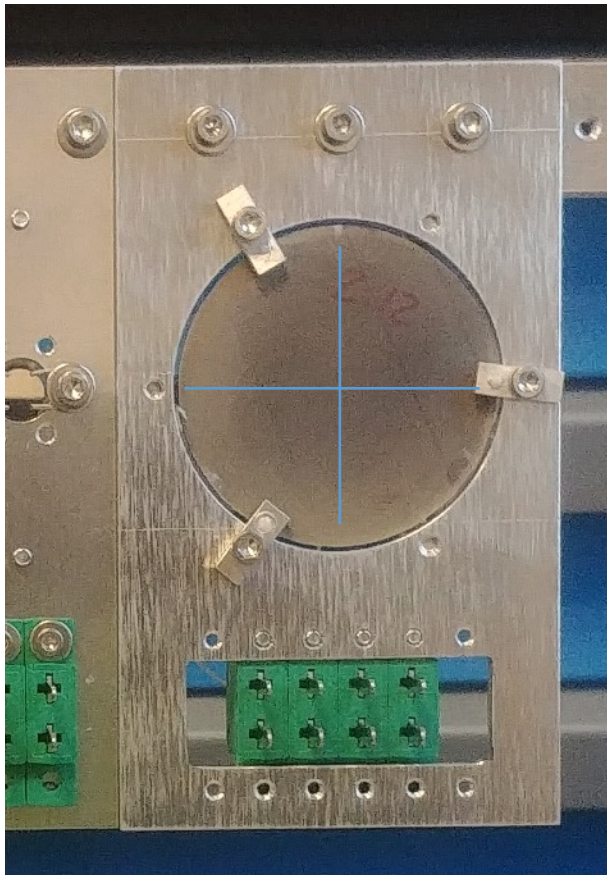
Target material and size

- Max temp simul done : 50 mm dia better than 25 mm to stay below cristallisation temp
- But… 25 mm still a good candidate : enable to place lot a targets on MAMI frame, important parameter regarding risk on broken wires during transport and manipulation ; plus easier to deal with (fewer wires on a single target)
- Dia 25 mm W target can be easily cut from current dia 50 rod
- Other material to be ordered
- Thickness to be specified… for cut and target design

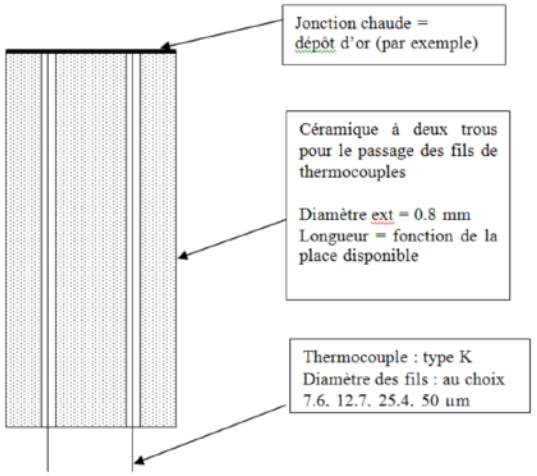
Target setup : design, measurement points configuration, mounting

- Re-use of the previous design for dia 50 mm target, but the isolated version (regarding max temp, simpler design and mounting operation)
- 3 + 1 (brim) thermocouples max, 1 + 1 min
- At least one un-connected thermocouple placed in beam to monitor background noise (2 butt to butt wires making a single line, may be installed in pipette rod used as a sheath / holder)
- 1 or 2 thermocouples for room temp.
- Likely repositioning of feedthrough connectors (vertical to horizontal position for better cable routing, and enabling welding with wires already fixed on connecters [done to avoid stress on wire weld]) ; any noise due to loop crosses by beam ? -> mix H and V orientation ?
- For setup using pipette thermocouples, need of pipettes holder
- Design task : 1 week

- Target manufacture : 1 month (IJCLab) / 2 weeks (subcont)
- Pipette manufacture : 1 month
- Welding / mounting : 2 weeks (cross hairs and welding done on “equipped” target)
- Extension cables to be done (see Olivier Duarte) ; adding a shield is a plus (to be bought)



Crosshair on entrance face



“Pipette” thermocouple