Subgroup

INFRASTRUCTURE

Daniela Kiselev & Shunsuke Makimura

- Q & A
- Topics for collaboration

BRIDGE2023, 18-20.10.2023

Summary Subgroup Infrastructure:

15 people attended!

Topics for collaboration

1. HIP (Hot Isostatic Pressing) for collimators, beamdumps, cooling plate:
   Idea:
   Comparison of cooling efficiency in mock-up made by
   HIP and brazing (PSI-method)

2. Radiation resistant coils from MIC (company in Japan)

3. Pillow seal (500 mm diameter)

4. Grooves in Graphite target for diagnostics beam position

5. Thermal & structural simulation graphite wheel

6. muon beam transport

7. Infrared/CCD camera for temperature measurement/beam position

Daniela Kiselev & Shunsuke Makimura

How to proceed:

- Define people for each subject
- Video conference in individual subgroups
  2x/year in subgroup Infrastructure
- 1. meeting/Email: Check requirement/status of selected topic
- Check MoU: → create appendices

Leaders of subgroups:

1) HIP: Shun Makimura, Daniel Laube
2) Coils: Hitoshi Takahashi, Alex Gabard
3) Pillow seal: xx, yy, Pascal Meyer
4) Target grooves: Naritoshi Kawamura, Davide Reggiani
5) FEM: xx, Raffaello Sobbia
6) μ-Beam simulation: Naritoshi Kawamura, Andreas Knecht
7) Infrared: Shiro Matoba, Jochem Snuverink


Discussion in BRIDGE2023
Infrastructure

Subgroup of Proton beamline technologies

Members

PSI
- Daniela
- Davide
- Raffaelo
- Daniel
- Jochem?
- Giovanni

J-PARC
- Shun
- Shinya
- Hitoshi
- Yoshi
- Keizo
- Fumimasa
- Yusuke
- Nari
- Shiro
- Y.
- Satoshi

Objects

PSI
- E & M target
- Impact HIMB
- Impact Tatoos

J-PARC
- MLF muon target
- COMET P1 & P2
- Hadron targets (fixed & rotating)

Proton beamline technologies
Experiments technologies

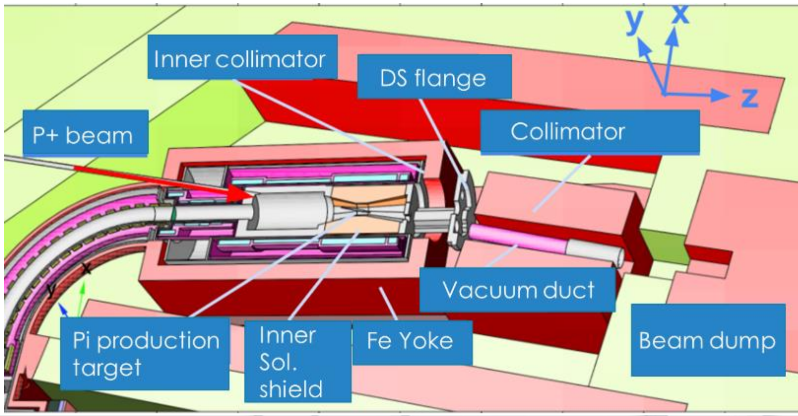
- Targets
- Monitors/Diagnostics
- Magnets
- Beamlines/Vacuum/Collimators/Beamsdumps
- Tools
- Methods/Technologies
- Material development/Radiation damage

Topics driven by

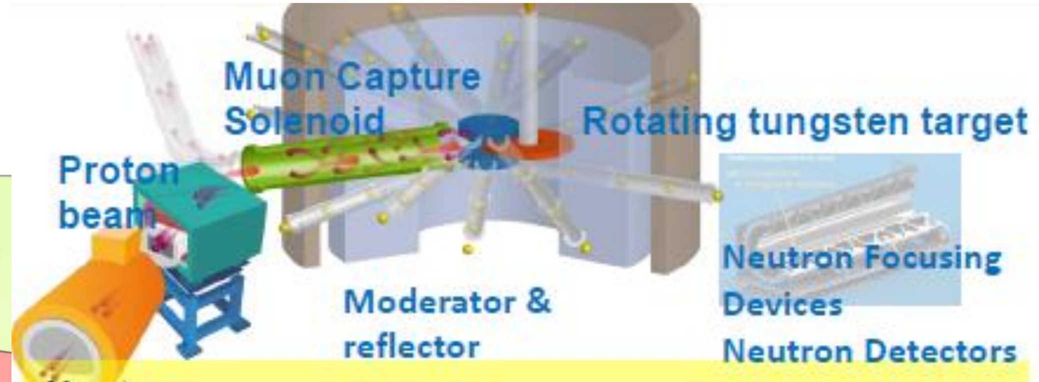
- New facilities
- Upgrades
- Improvements/Problems

New Facilities/Upgrades

COMET

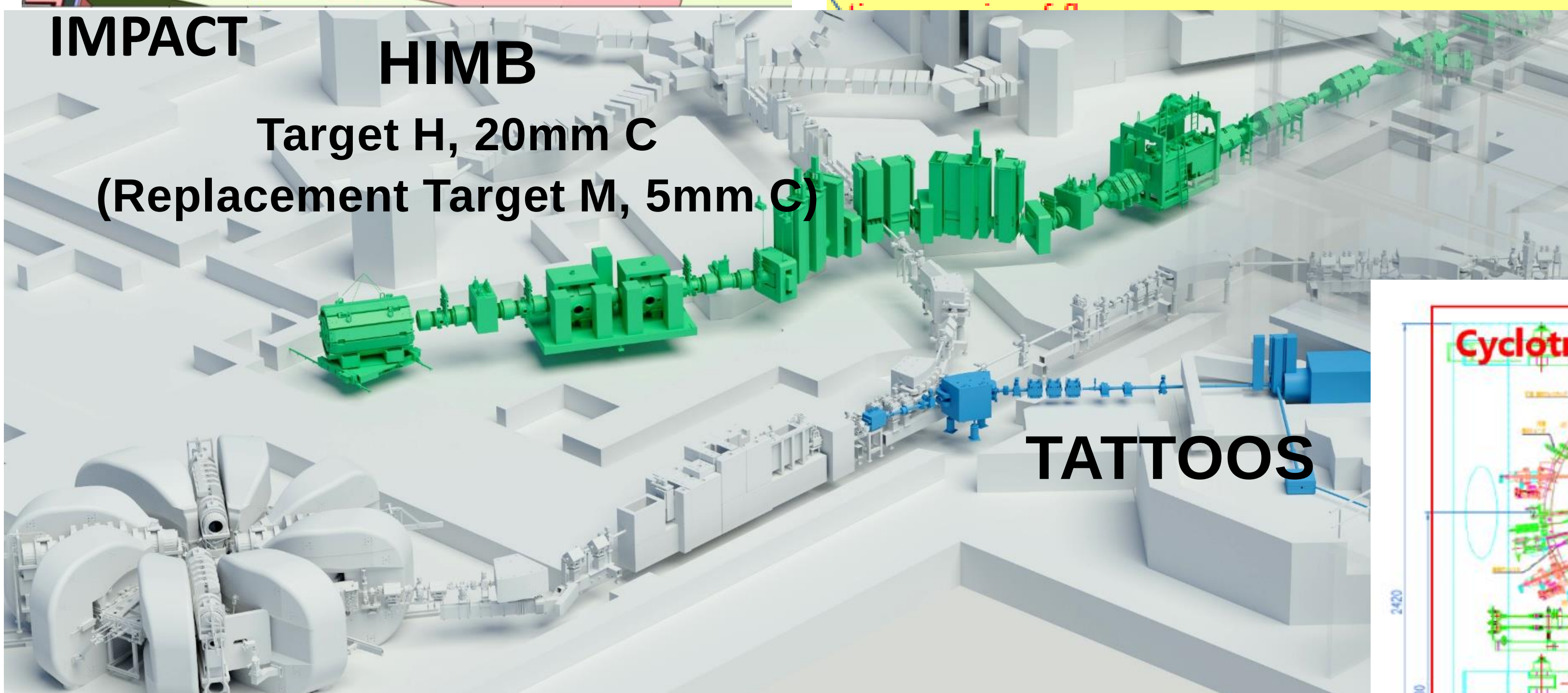


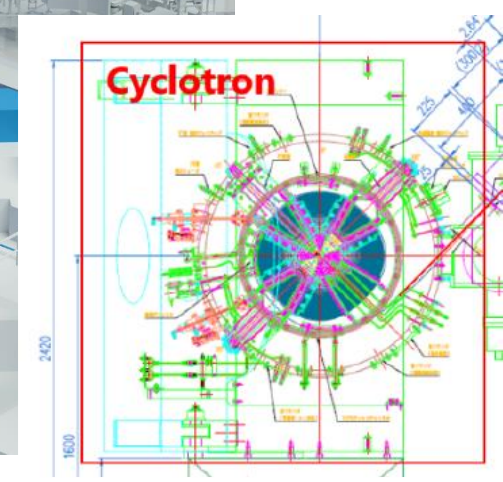
MLF TS2



Neutron:
10 (target) x 2 (device) → 20 times gain of brightness

Muon: :
10 (target) x 5~10 (Muon capture solenoid) → 50 ~100





Proton beamline technologies

Manufacturing technologies of beamline components

□ Technologies sharing from J-PARC to PSI

- Collimator: Hot isostatic pressing method (HIP)
- Radiation Resistant Magnet: Mineral Insulation Cable (MIC)
- Pillowseal with large diameter:

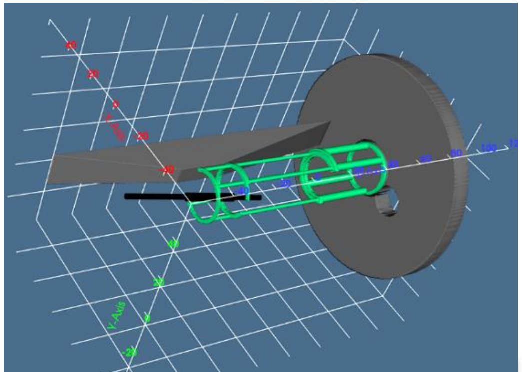
□ Technologies sharing from PSI to J-PARC

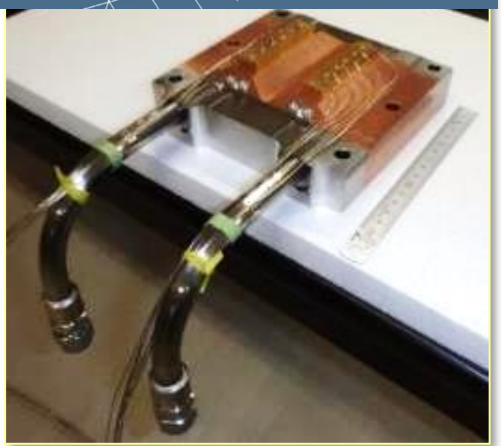
- Rotating target geometry improvement: Beam transport
- In-situ measurement of rotating target: Data analysis, thermal & structural analysis
- Design of horizontal cask

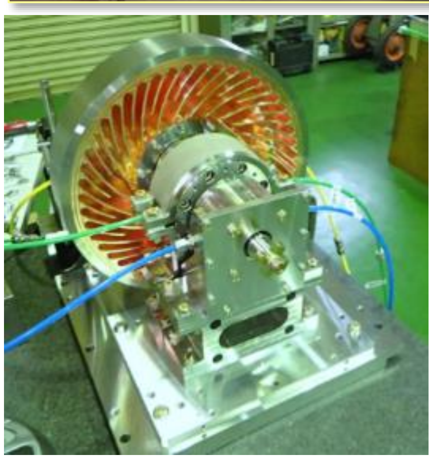
□ Challenge for common technologies

- 3D-printing technologies
- In-situ measurement technologies: Capacity, infrared camera, CCD imaging+optical fiber
- Repair device for pillowseal-mating-flange

- **Targets**





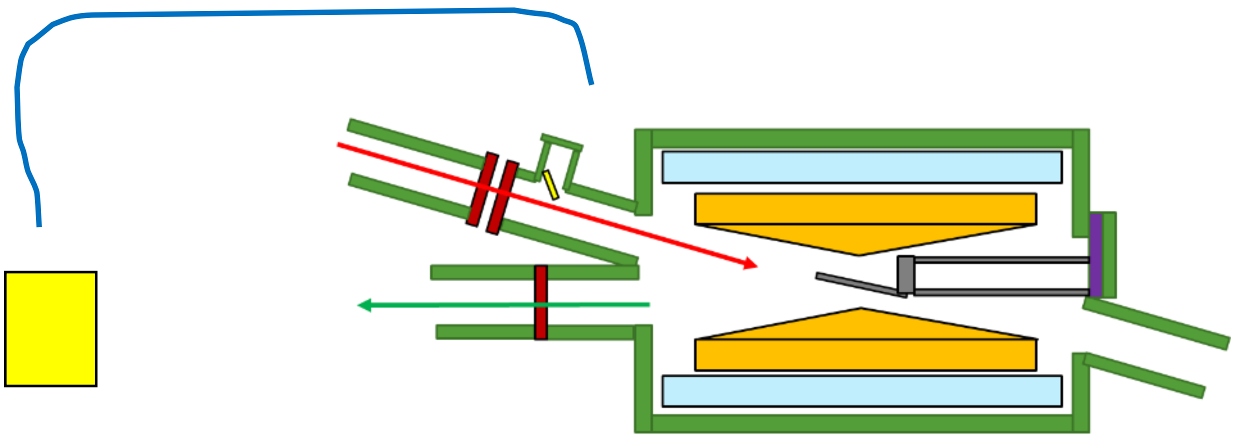


2 Targets

1 Bearing

- **Monitors/Diagnostics**

Beam profile measurement on COMET target

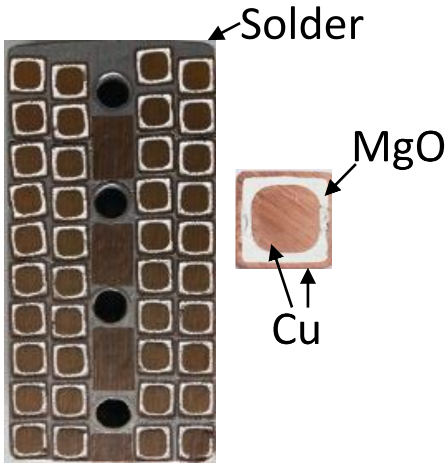


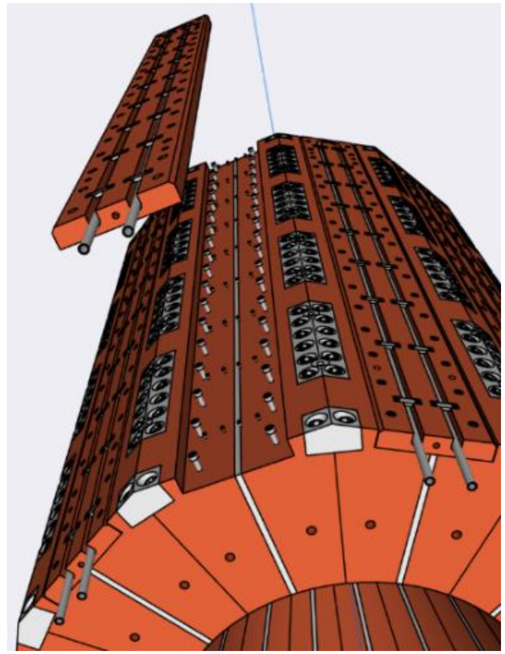
CCD

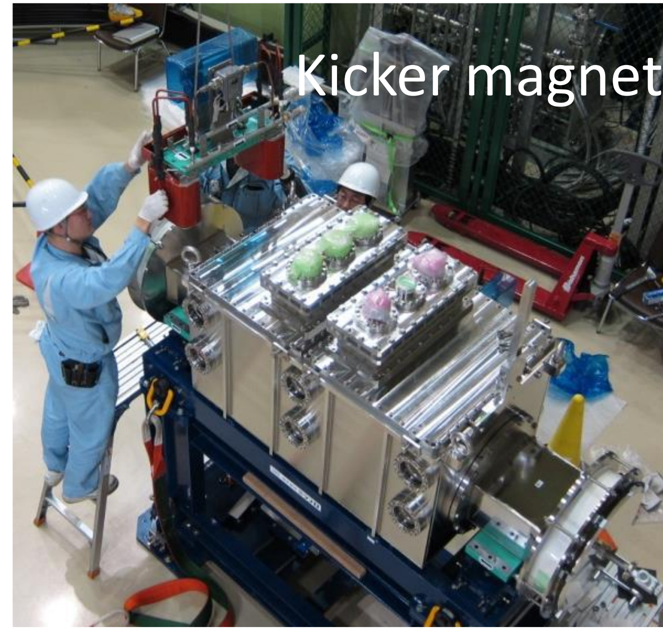
Infrared camera: for measuring temperature

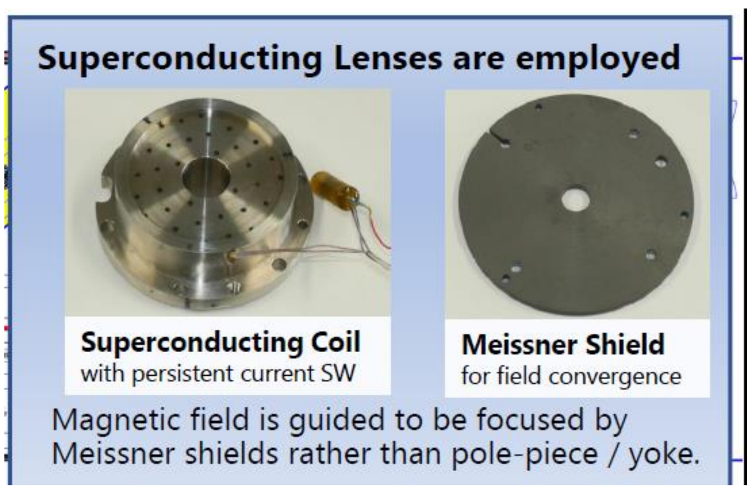
- **Magnets**

Typical cross-section of PSI radiation-hard coils

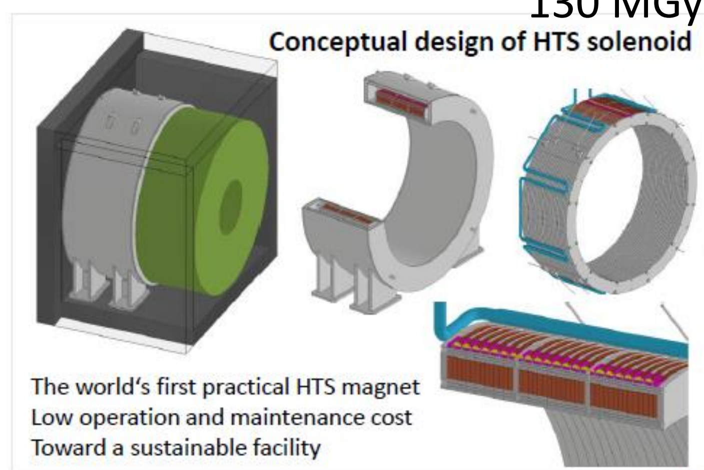




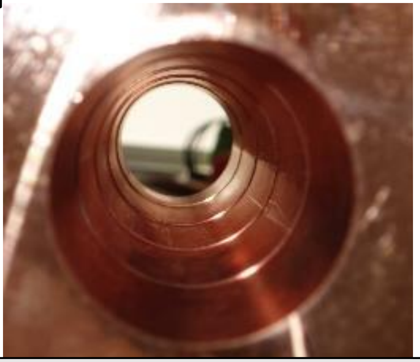




130 MGy

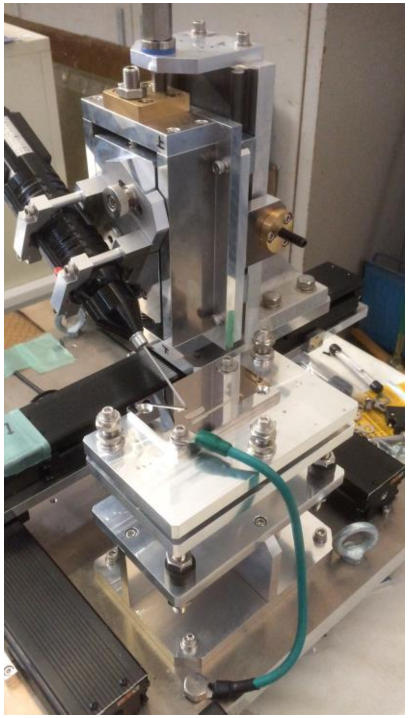


- **Beamline/Collimators/Beamdumps**



Scraper:
Water pipe is embedded in Cu

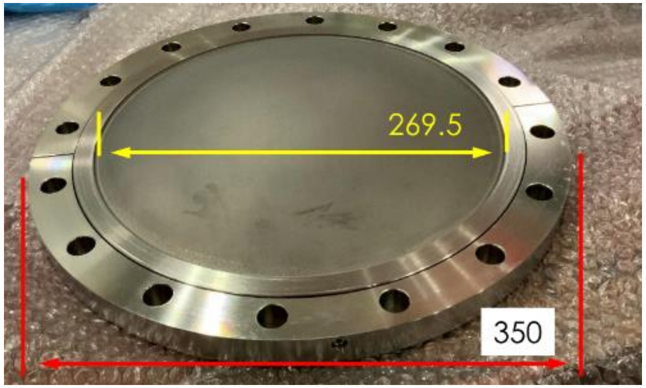
- **Tools**

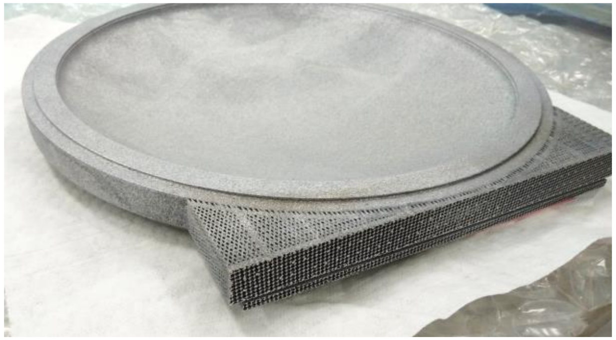


For IMPACT:
2 new exchange flasks

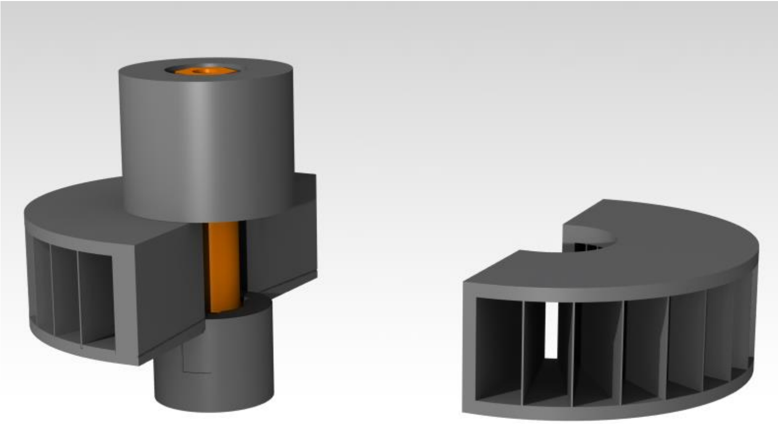
Remote-controlled replacement

- **Methods/Technologies**



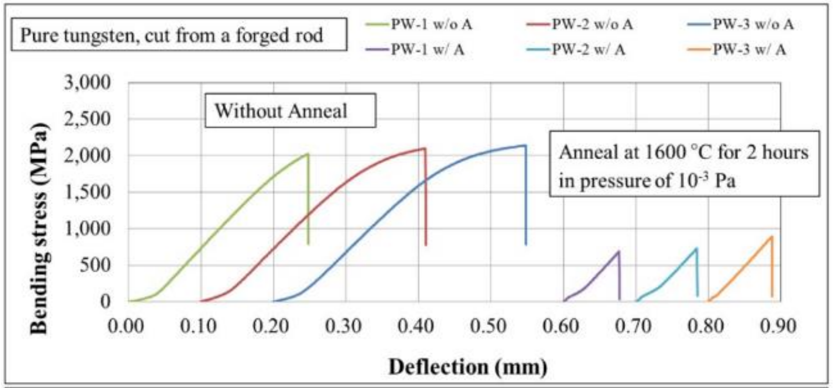


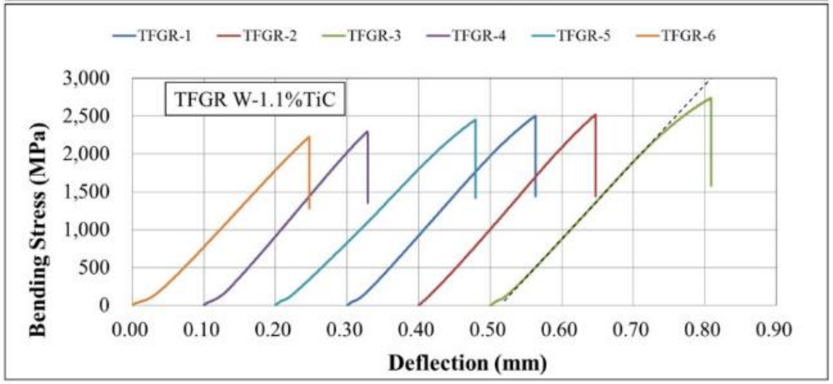
3D printing
Electron beam melting
HIP = Hot isostatic pressing



Materials (including radiation damage)

Tungsten development





Al-alloy: $AlMg_3$