

# Solid hydrogen target removal and foil change procedure

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## Procedure

1. Prepare chamber for target removal (See 'IRIS Target Removal' document for pictures)
  - Vent chamber
  - move downstream detectors further downstream and out of the way
  - Remove diffuser gas inlet from bottom of chamber. Remove tie wraps, undo screw and conflat flange below the diffuser actuator
  - Remove He lines from top of chamber
  - Unplug cables from gauges
  - Undo screws with black markings on top of chamber
  - Pull out upstream detector assembly out of the way
2. Removal of target
  - Clean test stand and table with ethanol
  - Crane out target to test stand. Guide out of chamber with people monitoring on both sides of beamline. Monitor loose cables and tools to protect detectors and target
  - Cover top of open chamber with plastic to avoid any particulates from entering the chamber
  - Move upstream detector assembly back inside chamber to protect detectors
  - Check foil for any contamination with pancake probe
3. Alignment Check
  - Once target is removed, alignment can be checked to the ball installed upstream of Iris
  - Check the collimator positions with alignment telescope

#### 4. Ag Foil replacement

- Remove old Ag foil with 600 grit sand paper and clean copper with ethanol
- Set new Ag foil on teflon plate with small amount of Apiezon grease between teflon and foil
- Set Araldite epoxy on the copper plate
- Clean up Araldite around the 6 mm hole with cotton swab
- Put on new Ag foil with teflon plate on to the SHT copper plate
- Clamp together with c-clamps, Kapton tape, and rubber bands where necessary
- Leave to sit over night with heater to cure the epoxy
- Carefully clean foil and cold head with ethanol to remove any fingerprints, grease, dirt, etc...
- Mark 4 points around hole position with marking pen and plastic guide plate

#### 5. Install target and alignment Check

- Clean top of chamber with ethanol and prepare for re-installing target
- Check alignment of target hole position and telescope
- Rotate target assembly for experiment type (e.g. (d,p) = SHT upstream, Ag-foil downstream)
- Install He lines and plug in gauges
- Connect gas inlet line for diffuser at bottom of chamber
- Remove alignment ball upstream of IRIS and re-install beam line
- Top up He supply to compressor if any was lost when reconnecting lines
- Black out any exposed G10 on chamber to avoid light leaks

#### 6. System tests

- Vacuum test chamber. Leak test with ethanol and He-leak checker if necessary
- Cryo test and monitor operating temperatures of heat shield and target
- Form test target
- Can weigh  $1\text{cm}^2$  Ag-foil sample to get estimate of thickness (need mg scale)