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Gravity Probe B Relativity Mission

Procedure for Post Commission Handling and Storage of SM Gyroscopes

GP-B P0278 Rev -A

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Procedure for Post Commission Handling and Storage of SM Gyroscopes

This procedure is to be performed only by persons listed as certified operators.

Equipment: Overhead crane
100 liters Liquid Helium
Gyroscope Commissioning Probe clean room
Stainless steel pot
Anti-static "Poly" bag
Cubic 10 clean room garments

Preparation: Obtain the Cubic 10,TyVek garments and gloves required and place them in the anti-room of the commissioning probe clean room.

Cleanliness precautions: These procedures are to be performed while wearing Cubic 10 clean room garments.

Before beginning gyroscope removal

Make sure the commissioning probe clean room is cleared of any unnecessary tools or equipment. Next rinse the probe with filtered air to dislodge any particles that may have accumulated while the vacuum can was removed. Finally, rinse the bench that sits directly below the probe with ethyl alcohol and inspect any surfaces surrounding the probe. When leaving the clean room close the interior doors and remove the top layer of the sticky mat.

During gyroscope removal

Always keeps your hands *downstream* of the gyroscope. Do not let anything come between the HEPA filters and the gyroscope.

ESD precautions: Person performing this procedure must wear a ground strap.

Conditions: Completion of P0275 or termination of the low temperature commissioning for other reasons.

Procedure: **I.** Gyroscope Commissioning Probe Removal

Preparation to disconnect probe from pumping system

1. Evacuate spin-up and vent manifolds (green handle on probe) _____
2. Close spin-up bypass and exchange gas inlet (both green handles on probe) _____
3. Close 2" exhaust line bypass (black handle connecting flex hose to ion gauge "T". _____
4. Close 2" exhaust line (gold handle on top flange of probe) _____
5. Check that roughing valve is closed _____
6. Close vatterfly valve; (install protective cap) _____
7. Close foreline valve _____
8. Shut off turbo pump _____
9. Open vent nitrogen gas supply _____
10. Someone needs to monitor the process for at least 30 minutes following the shutdown of the pumping system _____
11. Disconnect spin-up and exchange gas lines. _____

After pump manifold has come up to atmospheric pressure:

12. Remove instrumentation cable, filter, baritron cables and SQUID cables (*Be sure that SQUID controller is OFF before disconnecting the SQUID cables*) _____
13. Remove exhaust manifold (2" bellows) _____
14. Remove bolts and studs on the 8" Conflat flange connected to bellows _____
15. Remove bolts securing the dewar to the floor and set down wheels _____
16. Position dewar below the crane, next to the platform and install lift fixture onto the vatterfly valve _____

17. Connect crane to airlock and feed instrumentation cable and baritron gauge cable through the airlock. Test the operation of the pneumatic release _____

18. Connect load cell and turn on _____

19. Remove bolts securing probe to the dewar _____

20. Install plugs into these bolt holes _____

21. Install transfer tube into dewar _____

22. Begin LHe transfer _____

23. Install the shutter assembly _____

24. Move the dewar into position under the crane and lower the airlock onto the collar fastening it with the marmon clamp _____

25. Lower the lifting fixture onto the probe _____

26. Lift gently to insure that clamp has engaged _____

27. Start lifting the probe maintaining positive pressure in the dewar at all times _____

28. Once the probe has cleared the collar, close the shutter _____

29. Unlatch the marmon clamp, position the probe/airlock over the clean room and insert the probe into the clean romm _____

30. Open the shutter and insert the baffle (Clean the baffle with Methanol) _____

(The following steps, *Steps II through V are completed after sufficient time has been given for the probe to warm*.)

II. Complete the gowning procedure, P0300.

III. Remove the vacuum can and place the stainless steel pot on the bench.

IV. Disconnect the following:

- Suspension lines (6 LEMO connectors)
- Ground plane (2 LEMO connectors)
- Optical fiber (2 LEMO connectors)
- UV bias wire (2 pin/socket connectors)
- Superconducting connection for parting plane pickup loop (2 niobium to quartz ball connections)
- Thermometer (GRT) (1 LEMO connector; optional)
- Heater (1 LEMO connector; optional)
- Spinup and exhaust bellows

Remember: use only a nonmagnetic screwdriver for this procedure.

IV**.** *Open the large loops, remove the nylon screws which hold the large loop to the support structure. Be careful to remove them from the side which is not hinged. You will need to open both large loops in order for the medium loop to have room to open sufficiently to remove the gyroscope. Next find the two (2) spacer rods which maintain the proper seperation of the medium loops. Remove the screw from one side of each of these rods. This will allow the two medium loops to fold out as they are also hinged at the bottom.*

With the loops open you are ready to remove the gyroscope from the support structure. Remove the two teflon screws on the lexan support tee and lift the gyroscope out using the lexan support tee while supporting the electrical cables and optical fiber with the other hand. Guide the gyroscope coaxially to the quadrupole and small dipole loops until the spin-up and exhaust nozzles clear the Helmholtz loops. Place the gyroscope in the stainless steel pot and put the pot into the "poly" bag.

V. *Upon successful completion of I through IV return the gyroscope to clean room 132 while in the stainless steel pot and "poly" bag. The gyroscope is then stored in the drybox until a final decision is made. The person who recieves the gyroscope and the person who delivers it each sign the section V of P0281.*