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Gravity Probe B Relativity Mission

Low Temperature Gyro Spinup Procedure

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Low Temperature Gyro Spinup Procedure

This procedure is to be performed only by persons listed as certified operators of the gyroscope acceptance facilities.

Purpose: To spin the gyro to a selected spin speed..

Experimental Conditions: Gyroscope levitated and rotor placed in a desirable position

Equipment: DDC Suspension System
SQUID Electronics
Data acquisition system
Vacuum gauges
Exhaust pumping station

Procedure A (For experiments where a flow rate larger than 50 sccm is required.):

1. Make sure that the gyro is placed at the desirable position and is already spinning at a measurable frequency; and the data acquisition programs are working adequately. If intending to use the gyro heater, make sure an adequate power supply is connected to the heater and turning on the heater will not interfere with operation of the gas handling system; make sure that the exhaust pump is on and the main pumping station is pumping on the probe;

2. Close the following valves: Spin-Up Gas Supply, Manual Probe Inlet, Exchange Gas Inlet, Spin-up Pump Out, Manual Probe Exhaust, By-Pass to HVPM;

3. Open the following valves: PV4, PV1 (2000sccm), PV2, PV3, Exchange Gas Supply;

4. When the exhaust pressure is less than 5×10^{-3} torr, close PV2, PV3 and Exchange Gas Supply;

5. Open Manual Probe Inlet, Manual Probe Exhaust.

6. Open Spin-Up Gas Supply Valve. Establish a flow of about 30 sccm;

7. Close PV4; open PV5 and then PV2; then gradually increase the flow rate to the desirable value. **Make sure that during this process, the probe pressure is always less than 10^{-3} torr;**

8. When the gyro reaches the desirable spin speed, gradually reduce the flow rate to zero and then close PV2 and Spin-Up Gas Supply Valve;

9. When spin-up inlet and exhaust pressures are both below 0.5 torr, close PV5. **Make sure that the probe pressure is always less than 10^{-3} torr.**

Procedure B (For gyro spin down with a flowing gas):

1. Make sure that the main pumping station is pumping on the probe, and the following valves are closed: PV2, PV3, PV5, the Exchange Gas Supply, the Spin-up Pump Out, the By-Pass Valve to HVPM;

2. If Manual Probe Inlet and Manual Probe Exhaust are closed, pumping out the gas behind the valves, and then open the two valves;

3. Establish a flow about 10sccm with PV1 switched to the 50sccm (green indicator);

4. Close PV4, and then open PV3, **Make sure that during this process, the probe pressure is always less than 10^{-3} torr;**

5. When the gyro reaches the desirable spin speed, close PV3. Then turn of the flow.

Procedure C (For experiments where the desired spin speed is less than 10 Hz):

1. Make sure that the gyro is placed at the desirable position, and the data acquisition program is ready to measure the spin speed;

2. Close the following valves: the Spin-Up Gas Supply, the Manual Probe Inlet, the Vent/Exchange Inlet, the Manual Probe Exhaust, the By-Pass to HVPM;

3. Open the following valves: PV4, PV1 (50 sccm), PV2, PV3, the Exchange Gas Supply;

4. When the exhaust pressure is less than 5×10^{-3} torr, close PV2, PV3 and

the Exchange Gas Supply;

5. Open Manual Probe Inlet;

6. Open Spin-Up Gas Supply Valve. Establish a flow less than 10 sccm;

7. Close PV4, and then open PV2; then gradually increase the flow rate to the desirable value. **Make sure that during this process, the probe pressure is always less than 10^{-3} torr;**

8. When the gyro reached the desirable spin speed, gradually reduce the flow rate to zero and then close PV2;

9. Close Spin-Up Gas Supply Valve.

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