

COMMISSIONING AREA: DET

TASK TITLE	B5 waveplate installation and replacement of B1s photodiode [1]
TASK CODE	DET_12.3
TASK LEADER	R. Gouaty
PRIORITY	HIGH
GOAL	We want to install a half waveplate and a quarter waveplate on the B5 beam path in order to improve the measurement of polarization fluctuations. We also want to replace the currently noisy B1s photodiode with a lower noise one.

<p>PROCEDURE</p>	<p>Shift 1:</p> <ol style="list-style-type: none"> 0. Open the controls of SDB2 suspension and bench. Put DET_MAIN in PAUSE. Break vacuum of SDB2 minitower. 1. Put the ITF in NI single bounce. Engage SDB1 drift control. Push PR TY further away to get rid of the B1p ghost beam. 2. Block the bench in a position that is close to the nominal setpoints of the bench. In particular try to adjust TY and X setpoints (the vertical dof should be not too bad when the bench is blocked). 3. Disable Vbias of B1s photodiode, unplug B1s cables, check position of B1s air box 26 on the bench and remove it. Weight air box 26. 4. Install glass beam dumps on air box 12. Weight air box 12, and install it on the bench. Replug air box 12. Check that Vbias and shutter is working. Update electronic gains for DC and audio channels, and update current limit threshold in SDB2_dbox_bench. DC gain should be 12.96 mW/V and audio gain should be 0.0864 mW/V. Current limit should be 40 mA. 5. Unpack the half waveplate, check that the rotation mount did not move during transportation (check it with picture taken at LAPP). Weight half waveplate mount and its clamp. Weight the glass beam dump. 6. Install the waveplate on the B5 beam path before the photodiodes. Adjust the waveplate lateral position to have the B5 beam centered on it. Add a TY tilt to the waveplate (a few degrees) in such a way that the reflected light can be dumped. Install the glass beam dump as the proper position to dump the waveplate reflection. Check if there is light reaching the B5 Photodiodes. Otherwise adjust the following mirror in front of the waveplate to recover the beam on the B5 PD. 7. Correct the weight of bench. Then release the bench and rebalance it. 8. Adjust height of the bench with temporary weights, then restore suspension setpoints and close the control loops. 9. Check that the B5 beam is still passing roughly at the center of the waveplate. Then adjust the alignment of the B5 photodiodes. 10. Open OMC shutter with VPM process. Check alignment of B1s photodiode. 11. Lock the OMC on B1_PD3. Then unlock the OMC and adjust its temperature to the resonance condition. 12. with an IR card check the beam reaching the B1_PD3 photodiode to see if any ghost beam is visible. If necessary try to realign the B1_PD3 photodiode. 13. Open SDB2 control loops. Remove the temporary weights, close the minitower and start pumping. 14. Check the SDB2 timing, reconfigure each DAQ box of SDB2. 15. Once the pressure is under 1 mbar, restore the suspension control. 16. Put DET_MAIN in EXEC. <p>Shift 2:</p> <ol style="list-style-type: none"> 1. Recover the lock of the ITF up to Low Noise 3. Take ~15 min of data in good sensitivity conditions (coupling of frequency noise should be minimized). 2. Put the ITF in NI single bounce (do it manually with DET_MAIN in pause). Misalign BS_TX by -580 urad and BS_TY by +100 urad to send the single bounce beam to the B5 photodiodes. Check the alignment of the B5 photodiodes and take 15 min of data in these conditions. <p>Shift 3:</p> <ol style="list-style-type: none"> 0. Open the controls of SDB2 suspension and bench. Put DET_MAIN in PAUSE. Break vacuum of SDB2 minitower. 1. Block SDB2 bench in an arbitrary position. 2. Install the Thorlabs RSPC around the waveplate column to mark its position. Remove the half waveplate. 3. Unpack the quarter waveplate. Check that its rotation mount did not move during transportation (check it against picture taken at LAPP). Weight the quarter waveplate with its clamp. 4. Install the quarter waveplate on the bench, adjust the tilt angle in a similar way as the half waveplate. 5. Release the bench, adjust the balancing if needed. Adjust height with temporary weight and restore the control of the bench in air. 6. Put the ITF in NI single bounce and check that the reflection of the waveplate is still reaching the glass beam dump. 7. Open SDB2 control loops, remove temporary weights, close the bench and restart pumping. 8. During the pumping of SDB2, go to the SDB1 rack on the platform. Swap the open loop picomotor driver and check if the communication with the closed loop drivers can be recovered. 9. Check the SDB2 timing, reconfigure each DAQ box of SDB2. 10. Once the pressure is under 1 mbar, restore the suspension control. 11. Put DET_MAIN in EXEC. <p>Shift 4: (Tasks 1 and 2 are optional in the sense that they can also be performed later)</p> <ol style="list-style-type: none"> 1. Put the ITF in NI single bounce (do it manually with DET_MAIN in pause). Misalign BS_TX by -580 urad and BS_TY by +100 urad to send the single bounce beam to the B5 photodiodes. Check the alignment of the B5 photodiodes and take 15 min of data in these conditions. 2. Adjust blending of B1s photodiode with OMC shutter open. 3. Recover the lock of the ITF up to Low Noise 3. Take ~15 min of data in good sensitivity conditions (coupling of frequency noise should be minimized).
<p>REQUIRED ITF STATUS</p>	<p>10.0</p>
<p>REQUIRED # OF SHIFTS</p>	<p>4.0</p>
<p>CONCERNED HW&SW</p>	<p>SDB2 vacuum chamber, suspension and bench, B1s photodiode, waveplate on B5 beam path</p>

TEAM INVOLVED	P. Spinicelli, R. Gouaty, M. Was
REQUESTED SUPPORT	SBE, ISC, VAC, DAQ
PREDECESSORS	

[1] Enter a short but descriptive task title