

TCS-PC meeting

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Pros and cons

One-beam scanning

Merit

- SNR increase by a higher power detection at the test beam edge

Demerit

- Fringe visibility loss due to dense fringes made by different incident angle
- Amplitude should be corrected including this fringe visibility loss

Solution

- Long distance between PD and scanner (small angle operation of the scanner); longer than 26 cm

Two-beam scanning

Merit

- Cancelling phase shift caused by the scanner and tilt of beams

Demerit

- SNR reduction by a less power detection at the beam edge
- Calibration is necessary for amplitude measurement

Solution

- Sufficient power for the incident beams (above 5 mW for each beam with a sideband power of 0.25mW for one side; 5%)

Available test beam power

- PC1a: MC Lock:...[mW], Unlock...[mW]
- PC1b: PRC Lock:..., Unlock...
- PC2: between 24 mW and 35 mW (according to Romain) => **12 mW – 17mW at PD**

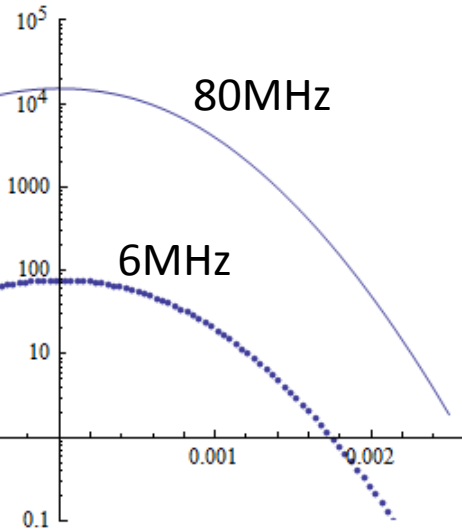
Sideband power of each USB and LSB

- 6MHz: $0.12 \text{ mW} < P < 0.17 \text{ mW}$ / **~0.5%** of carrier
- 56MHz: $0.020 \text{ mW} < P < 0.029 \text{ mW}$ / **~0.17%**
- PC3: under investigation

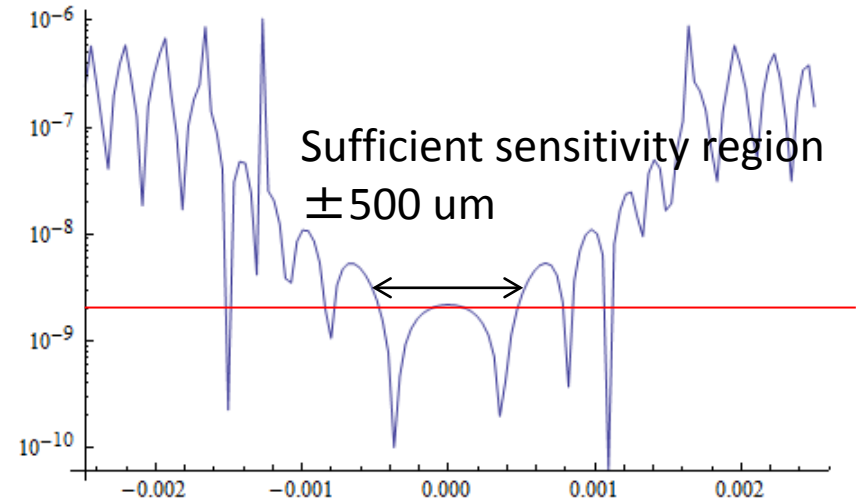
PC2 (One-beam scanning)

Flat Test: 12mW
Flat Ref: 7mW
PD-Scan: 50cm

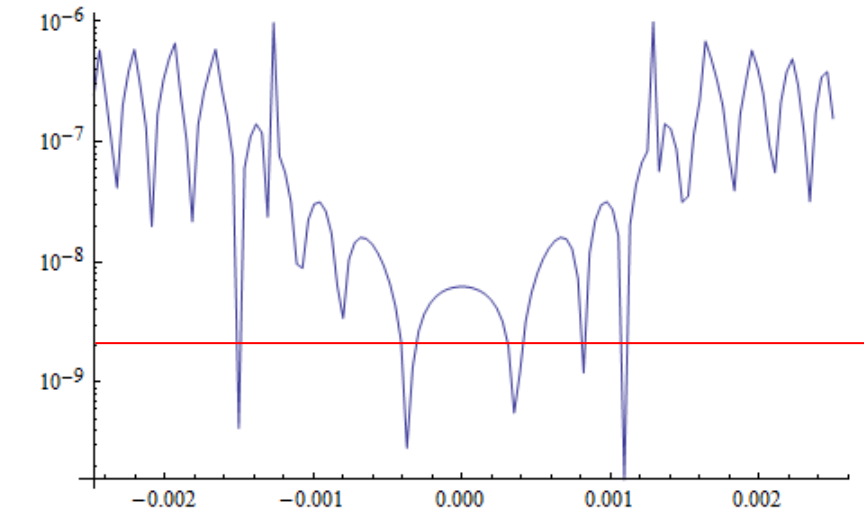
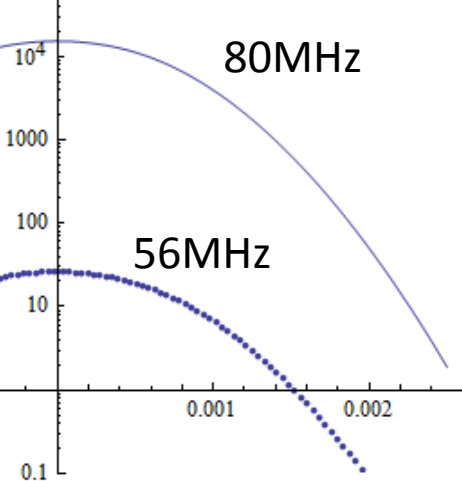
SNR



Sensitivity



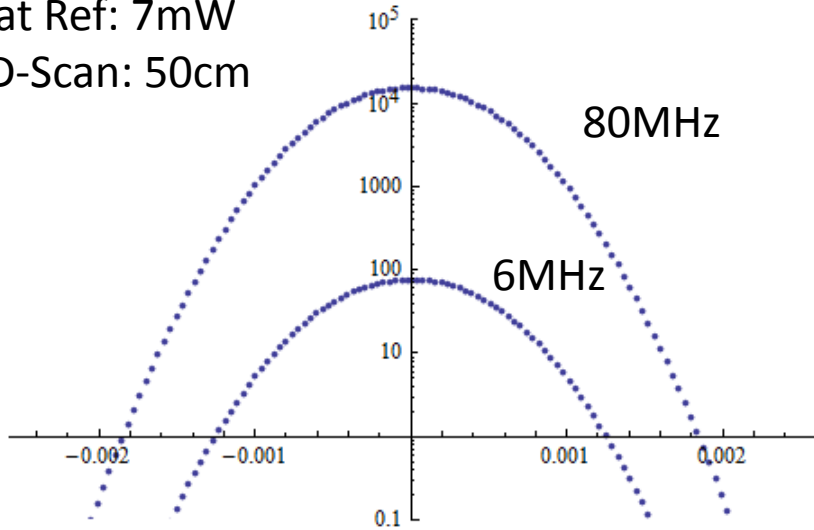
SNR



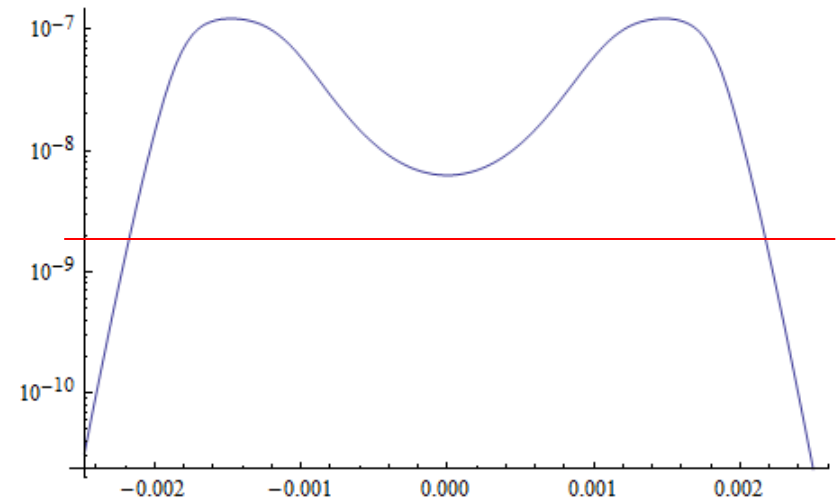
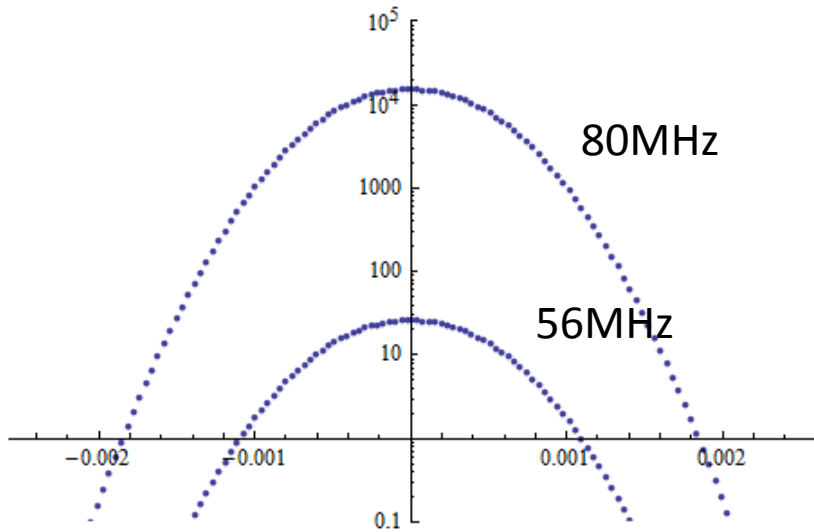
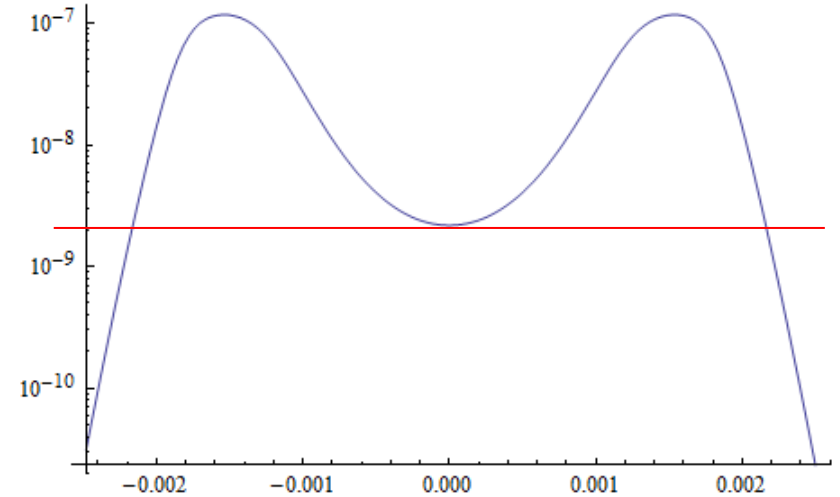
PC2 (Two-beam scanning)

Flat Test: 12mW
Flat Ref: 7mW
PD-Scan: 50cm

SNR



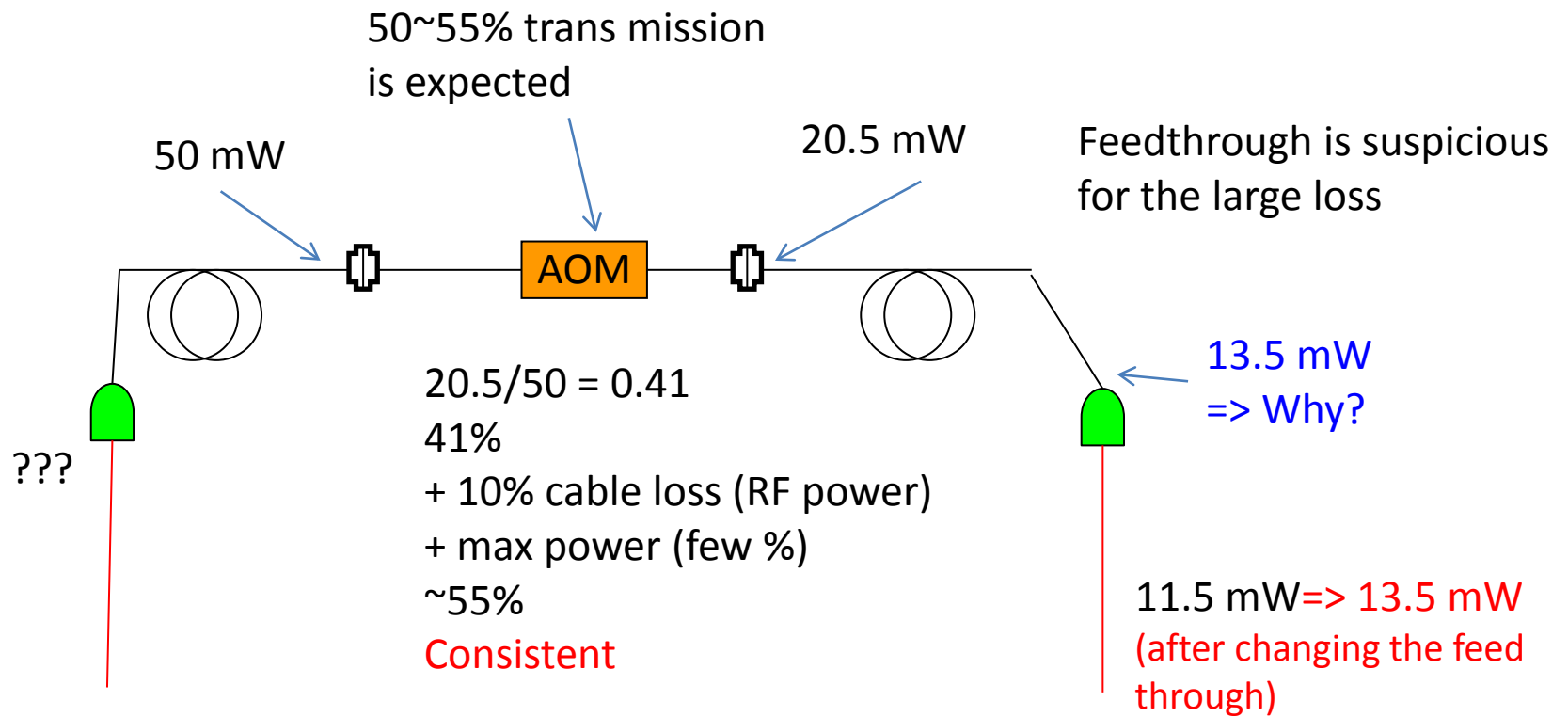
Sensitivity



Conclusion

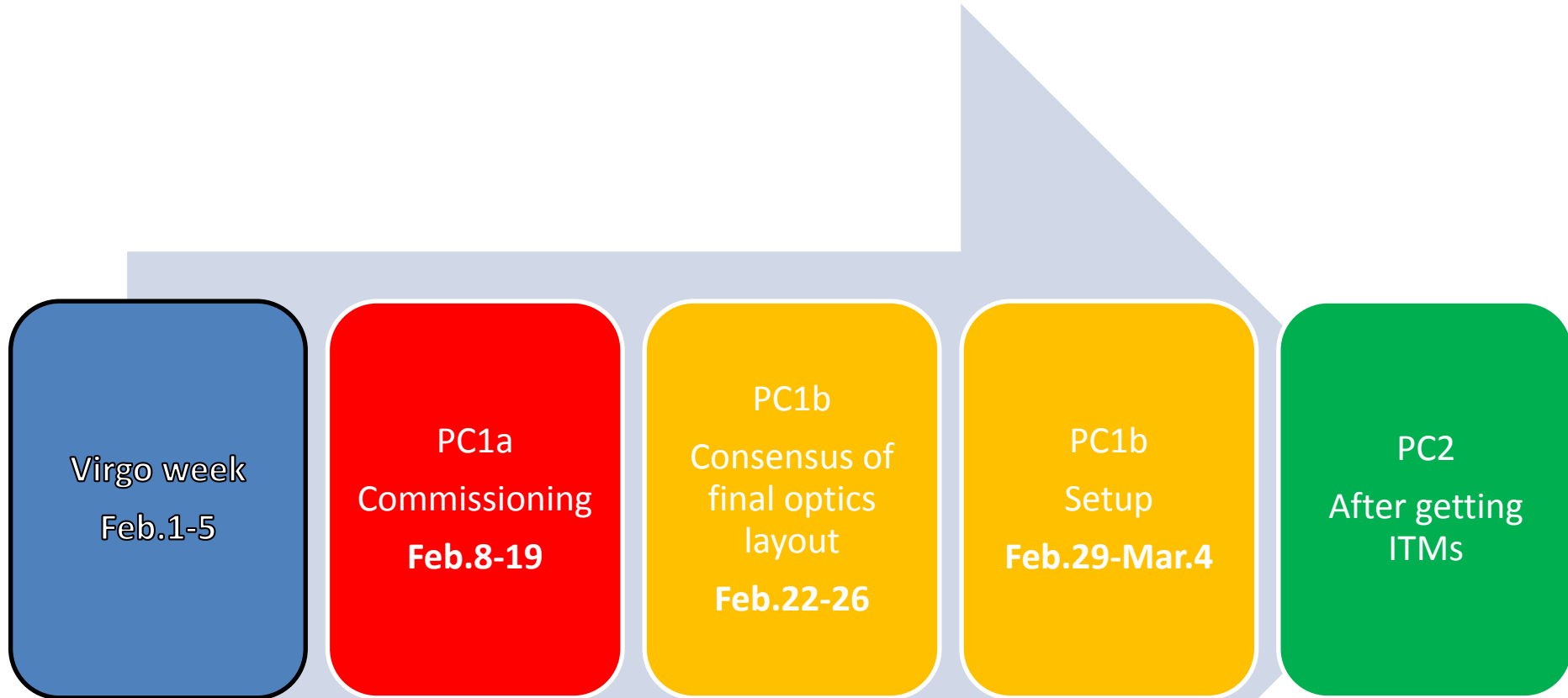
- One-beam scanning is better on PC2 (and PC3)
=> Less power is severe limitation in the current situation
- The situation of PC1b will be checked soon
- Power loss of the reference beam should be investigated to increase laser power

Laser power measurement (Reference beam)



13.5/2 \doteq **7 mW** is available at PD

Installation plan



PC1: Phase Camera 1, at EIB
PC1a: detect refl. of ITM,
PC1b: detect refl. of PRM
PC2: Phase Camera 2, at EPRB
PC3: Phase Camera 3, at EDB