



UPDATE ON THE E2E SIMULATIONS FOR THE CITF

DIEGO BERSANETTI 

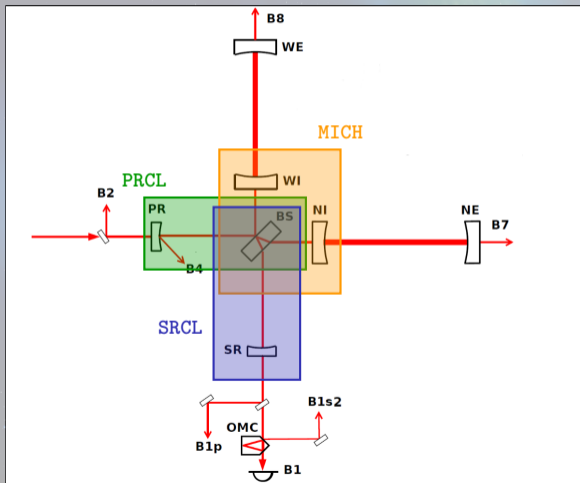
INFN Genova

VIR-0995A-20

ISC WEEKLY MEETING

NOVEMBER 11TH, 2020

Study of CITF Locking Triggers



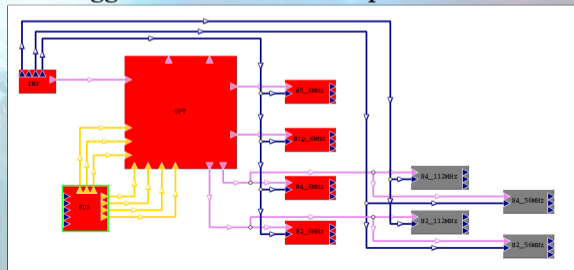
- Longitudinal degrees of freedom of CITF:

- ◆ $PRCL = l_P + \frac{l_N + l_W}{2}$

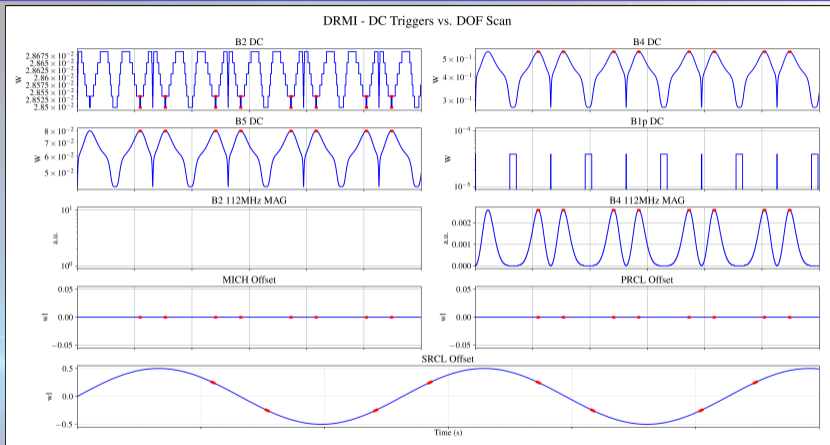
- ◆ $MICH = l_N - l_W$

- ◆ $SRCL = l_S + \frac{l_N + l_W}{2}$

- The three DOFs have to be locked “simultaneously”: study of the locking *triggers*, based on the DC powers



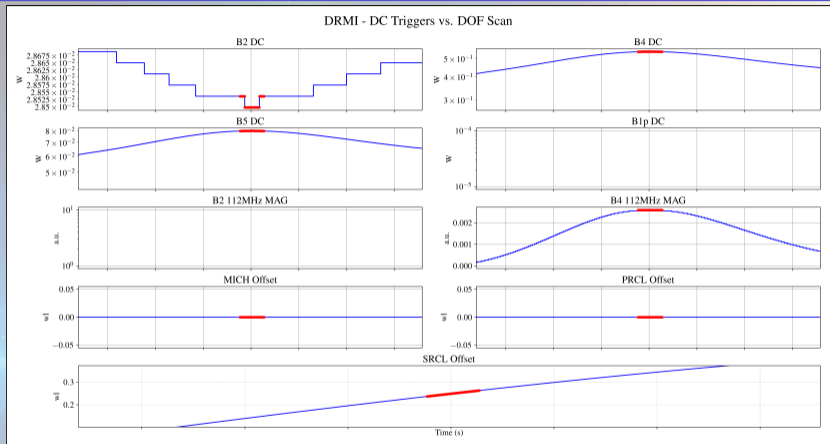
Scan of the SRCL Working Point



- MICH and PRCL are kept at zero
- SRCL is scanned to find the working point

- Figure of merit is B4_112MHz_MAG
- Maximum of SB power when $SRCL = \frac{\lambda}{4}$

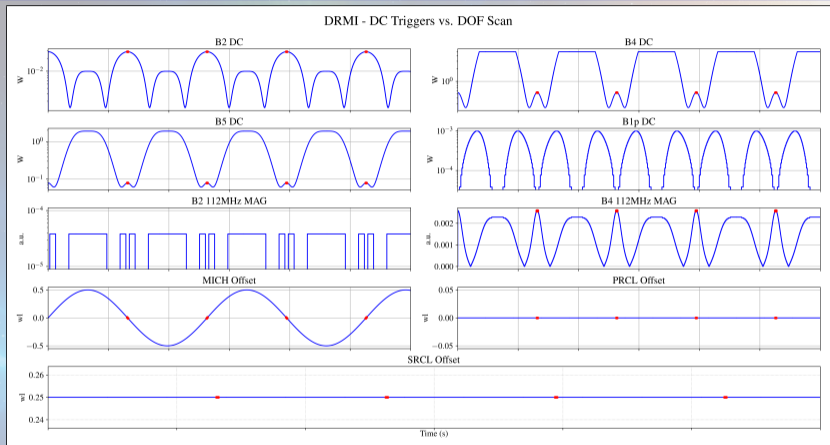
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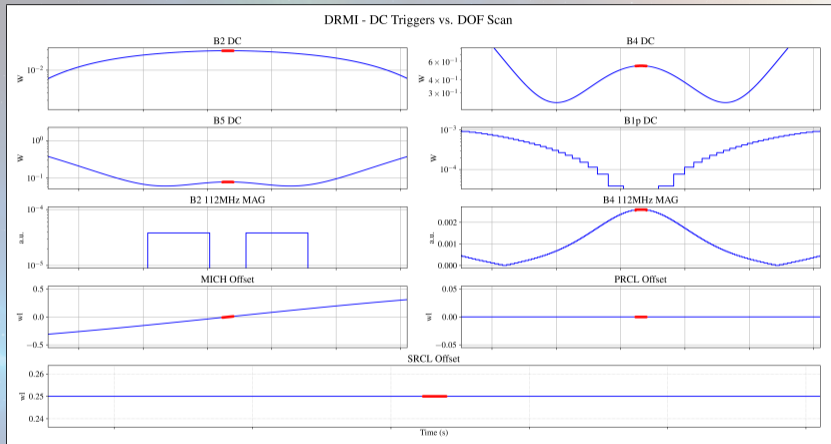
- Figure of merit is B4_112MHz_MAG
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Scan of the MICH Working Point



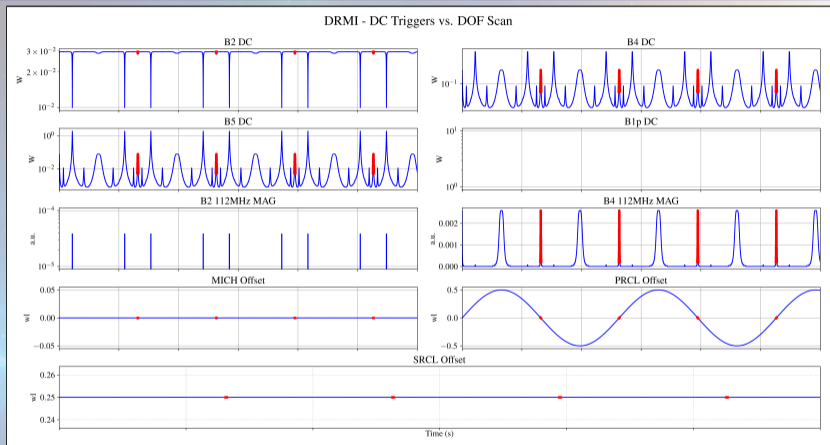
- SRCL is kept at 0.25, PRCL at zero
- All AdV+ parameters have been checked
- Electronic noise needs an update
- All signals are now calibrated

Scan of the MICH Working Point



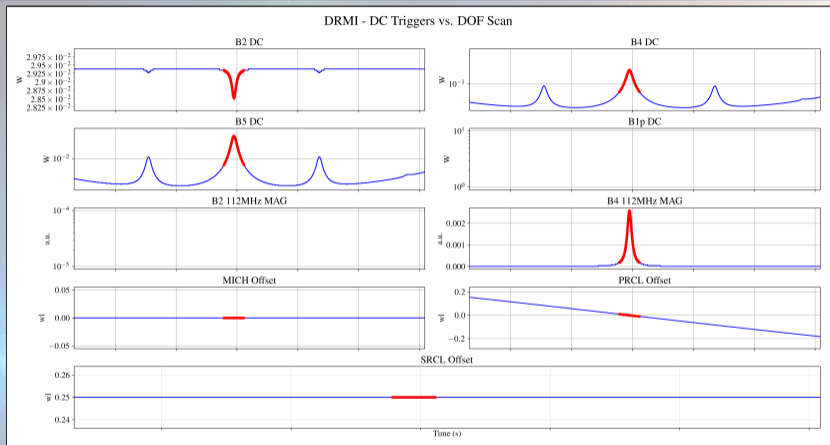
- SRCL is kept at 0.25, PRCL at zero
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Scan of the PRCL Working Point



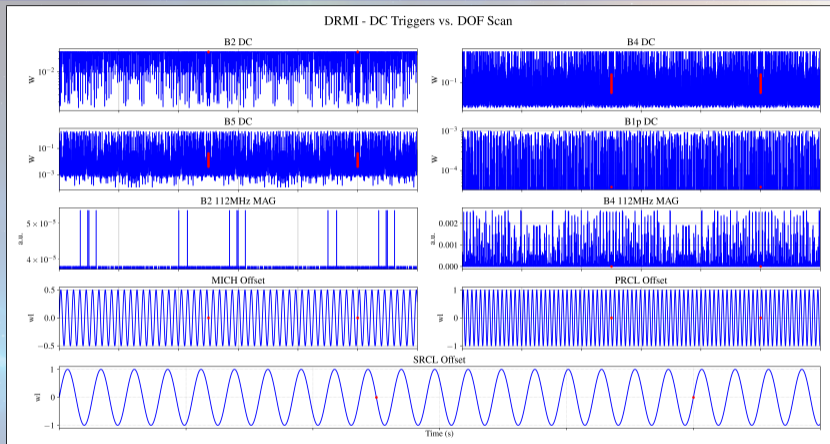
- SRCL is kept at 0.25, MICH at zero
- Mechanics still not used (fake lock)
- Single DOF scans done for completeness, could help for false positives

Scan of the PRCL Working Point



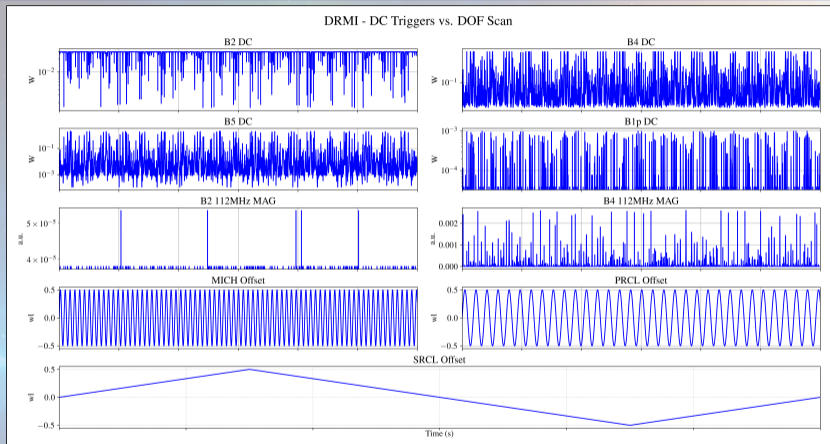
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Scan of the three DOFs



- Deterministic pattern
- Entire parameter space not scanned
- Can find good combination, but still not comprehensive

Scan of the three DOFs



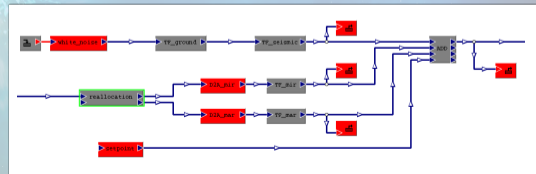
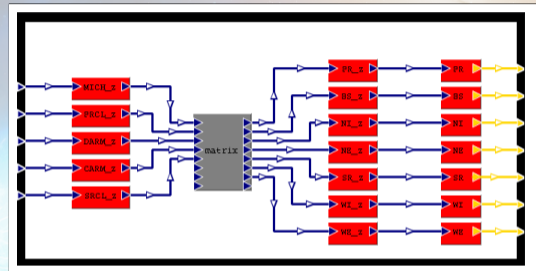
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Next Steps: Seismic Noise?

One possibility is to implement already the seismic noise:

- Randomness guarantees a more proper parameter exploration
- Need to change a lot the SUS module:
 - DOF_z and MIR_z now are just setpoints (ramp modules) in [m]
 - MIR_z must be changed in a PAY module
 - It has the mechanics, reallocation and seismic noise
 - Its input is DOF_CORR in [N], so to use it for fakelock a switch is needed to bypass it



The image features a cosmic background with a central blue energy burst and a white text box. The background is a dark blue space filled with stars and nebulae. A bright blue energy burst, resembling a starburst or a supernova, is centered in the lower half of the image. A white rectangular box with a blue border is positioned horizontally across the middle of the image, containing the text "THE END" in a blue, serif font.

THE END