Update on the E2E Simulations for the CITF

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ISC Weekly Meeting

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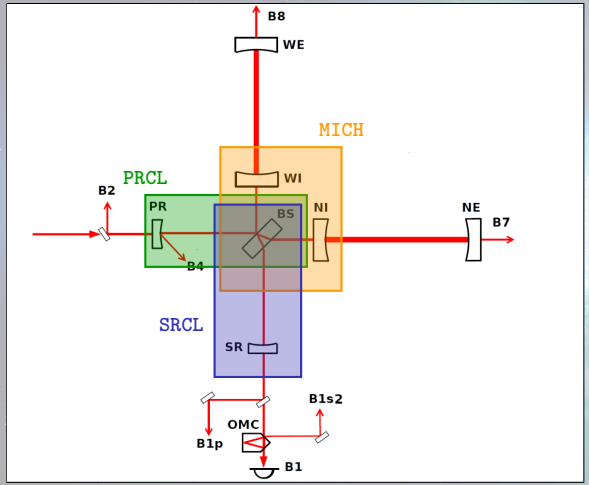
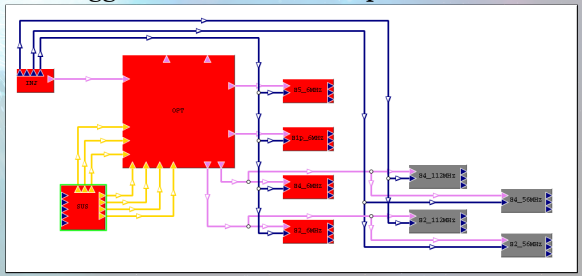
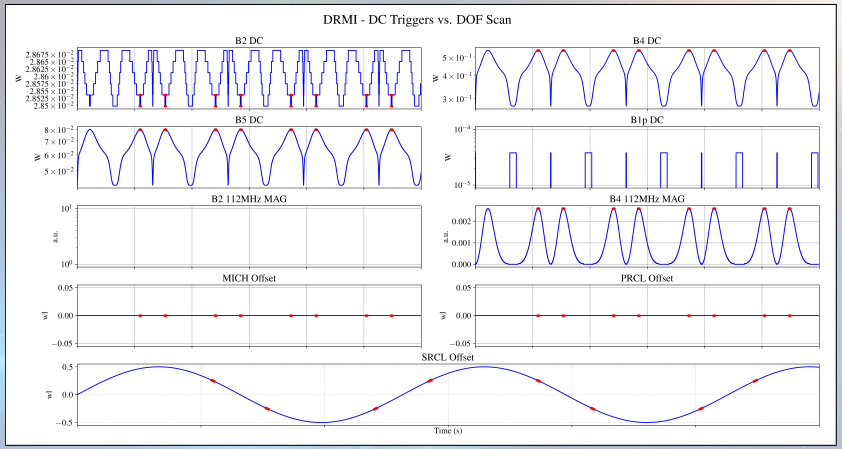
Study of CITF Locking Triggers



- 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

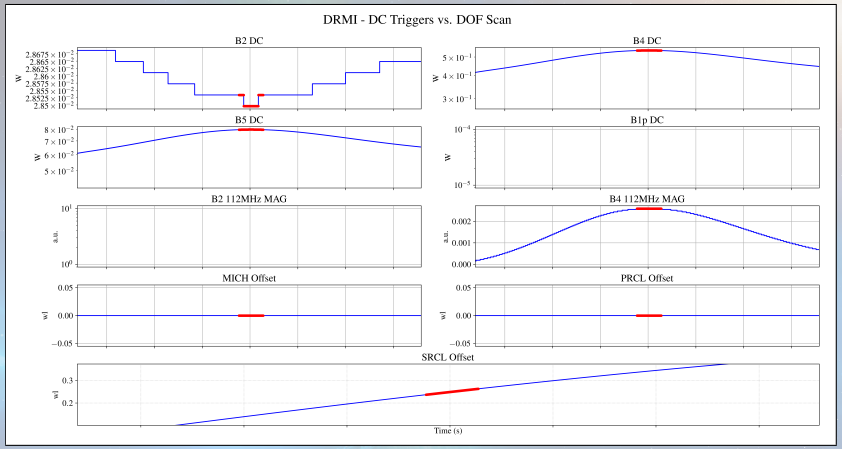


Scan of the SRCL Working Point



- `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 $\texttt{SRCL} = \frac{\lambda}{4}$

Scan of the SRCL Working Point



- MICH and PRCL are kept at zero
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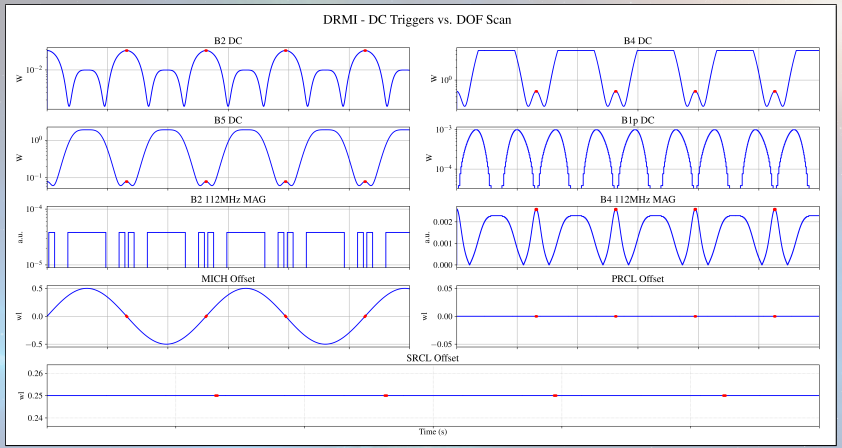
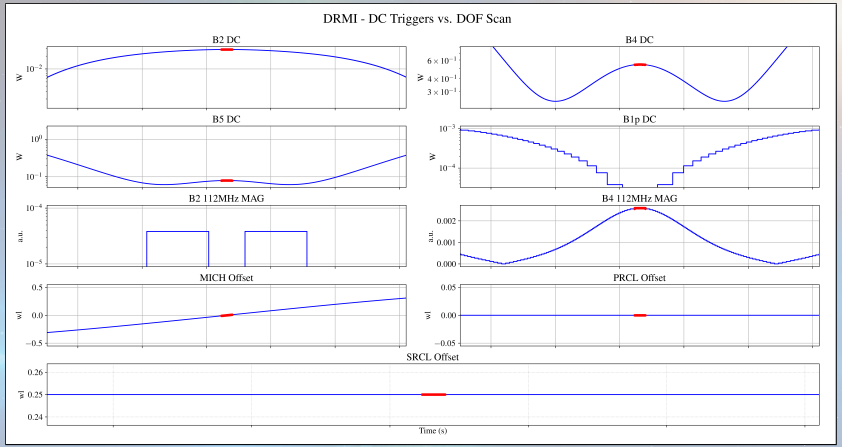
Scan of the MICH Working Point



- 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



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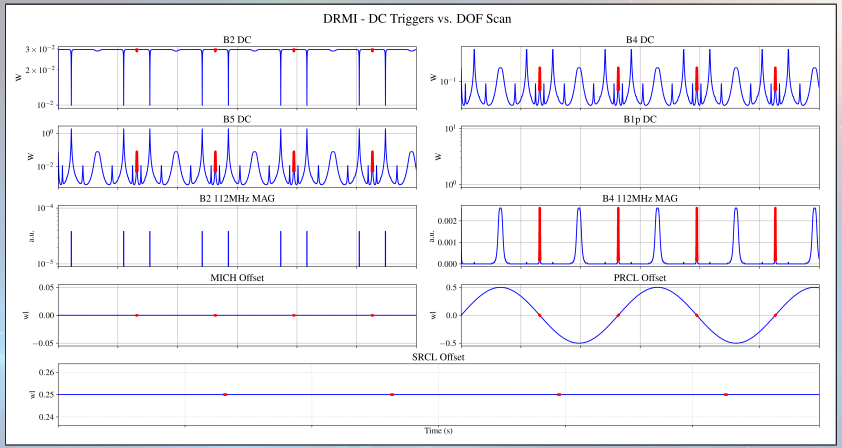
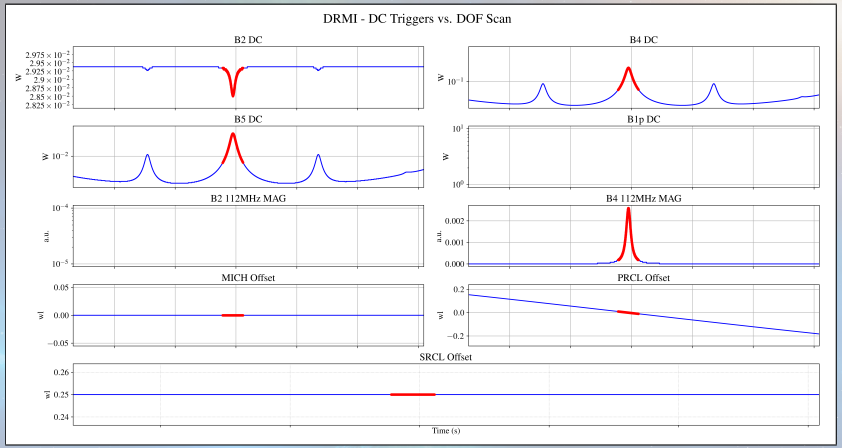
Scan of the PRCL Working Point



- 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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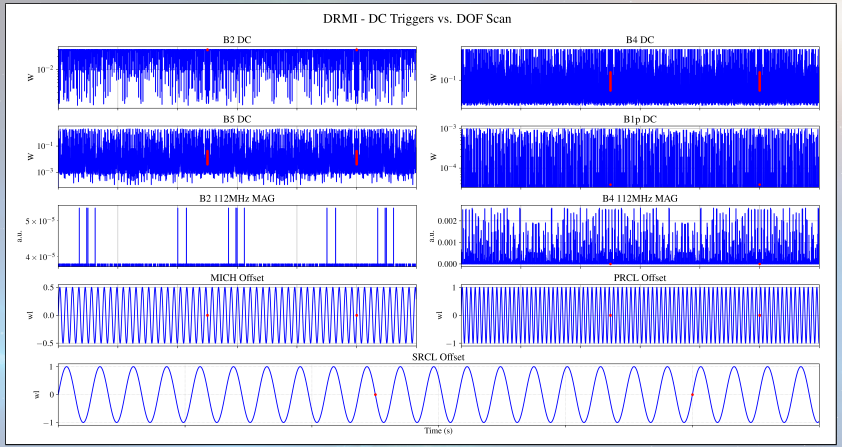
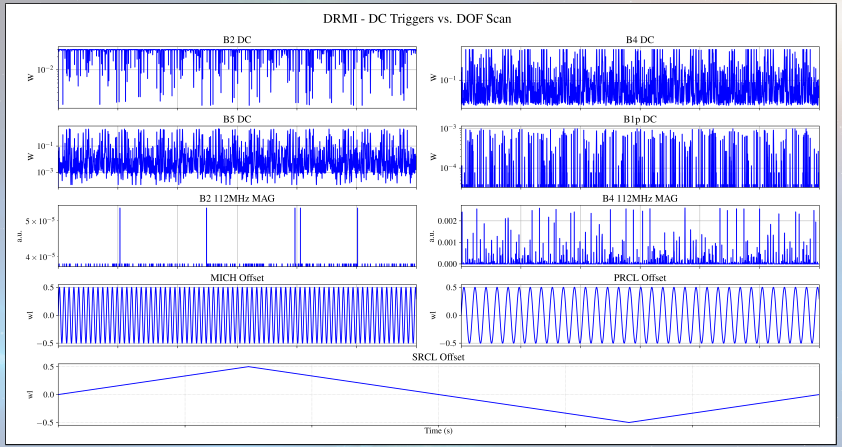
Scan of the three DOFs



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

Scan of the three DOFs



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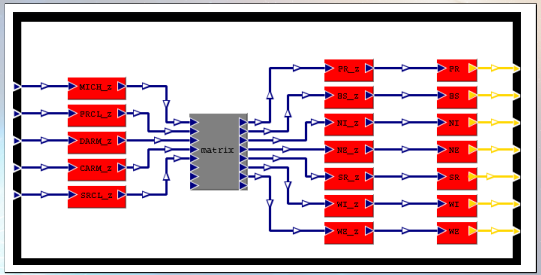
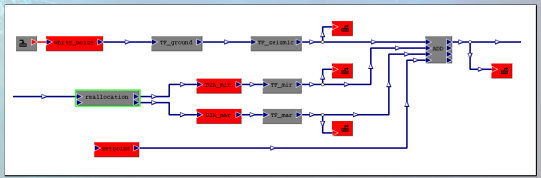
Next Steps: Seisimic Noise?

One possibility is to implement already the seisimic 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 End