Gaby suggested I look at the Rayleigh distribution of DARM_ERR for 10,000+ s lock segments.

Divide time series into many 10s segments, the statistics of each 1/10 Hz bin follow have sigma/mu = constant

\[ \Delta = 12 \text{ Hz} \]
L1:LSC–DARM_ERR in 50 second time slices

Normalized Specgram

Frequency [Hz]

Time [hrs]

mag(DARM/mean)
L1:LSC–DARM_ERR in 50 second time slices

With Bounce Mode
Harmonics
DMT, Root, and JohnZ

- Find long duration segments
- Read in all L1 (then L0) channels in 10s strides and calculate mean, Std.Dev., N x Bounce power
- Measure the coherence with DARM_ERR bounce mode:
  \[(x,y) = \text{sum}_i x[i] \times y[i], \quad \text{coh}(x,y) = \frac{(x,y)}{\sqrt{(x,x)*(y*y)}}\]
- Follow up the highest coherences
- Bounce modes show up much better in MICH_CTRL than in DARM_ERR

Pringle Mode Period

11.75 Hz DARM_ERR
L1:SUS-ITMX_RY mean
L1:SUS-ITMX_SYSYAW Mean
WRONG!
L0 Frames - lots more channels

Need to go to Raw frames - 3,000+ channels: HAM3 accelerometers not in L1, HEPI sensors only in L0 frame, etc.

Calculate coherences as before

RM strongest coupling

BS?

SR560’s thought to be the problem.... they weren’t

<table>
<thead>
<tr>
<th>Channel</th>
<th>Coherence</th>
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<tr>
<td>PEM-HAM3_ACCZ</td>
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<tr>
<td>SEI-BS_GEO_SEN_V2</td>
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<td>SEI-RM_GEO_SEN_V4</td>
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<td>SEI-ITMY_X</td>
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<td>SEI-ITMX_GEO_SEN_V1</td>
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<tr>
<td>SEI-MC2_GEO_SEN_V4</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Time series

- Definitely correlated
- Don’t know how it gets from accelerometers to MICH
- Quasi-periodic with ON/OFF character
- Possible sources: HVAC air compressor, De-I water plant, Chillers, Timeshared Air-handling turbine, etc

8.3 Hours
Connecting to Data Analyses

Used Laura’s bust summary pages to get

“BurstMon Pixel Frac > 4 to 2kHz”

Qualitative correlation between Pixel fraction and bounce mode

Hour-ish period visible in other BurstMon data sets as well.