Some notes on the Electro-Static Drives

July 1, 2014

LLO ESD actuation calibration, log 13298

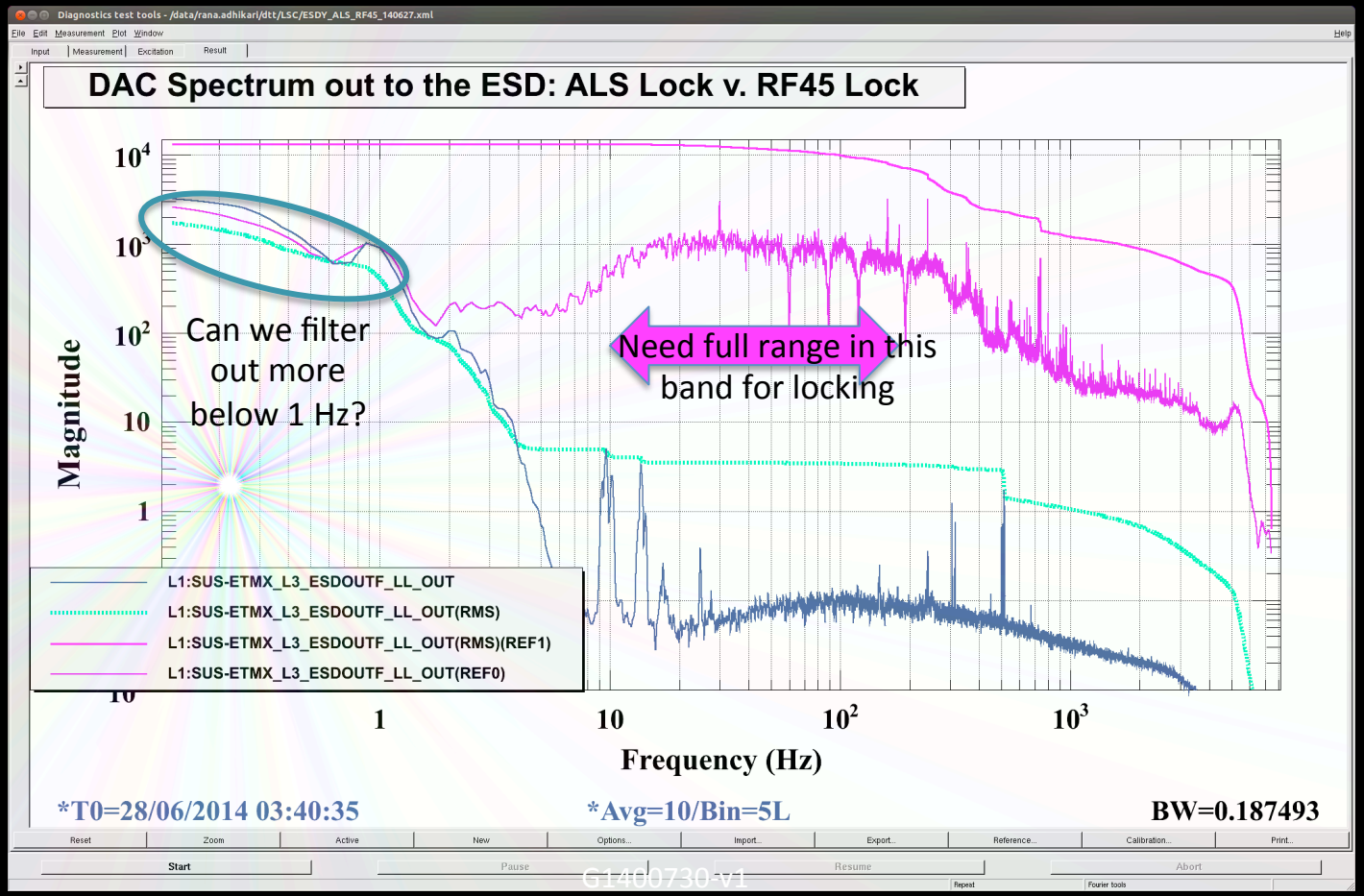
- Used ALS DIFF, at 42 Hz, bias at -400 V
  - ETMX: 1.85e-13 / f^2 m/count
  - ETMY: 1.73e-13 / f^2 m/count

131,000ct -> 400V
3e-3 V/ct

- Using $F = 2*alpha*V_{bias}*V_{sig} = x*M*(2pi\ f)^2$:
  - alpha = 1.2e-10 N/V^2
  - Linearizer increases effective bias to -560 V, reducing inferred alpha to 0.9e-10 N/V^2
  - Expected alpha = 4e-10 N/V^2

DAC noise

- DAC output noise is *150 nV/rHz*, higher than ESD input noise of *25 nV/rHz*: need some sort of filter between DAC and ESD



ESD noise monitors

- Each channel: straight 1/40 monitor, then differential output
- 1 uV/rtHz noise divided to 25 nV/rHz (each leg)
- ADC input noise is 4 uV/rtHz
- Need a pre-amp with a gain of a few hundred, AC-coupling at a few Hz (this is essentially what the SUS noise monitor circuit does, D070480)