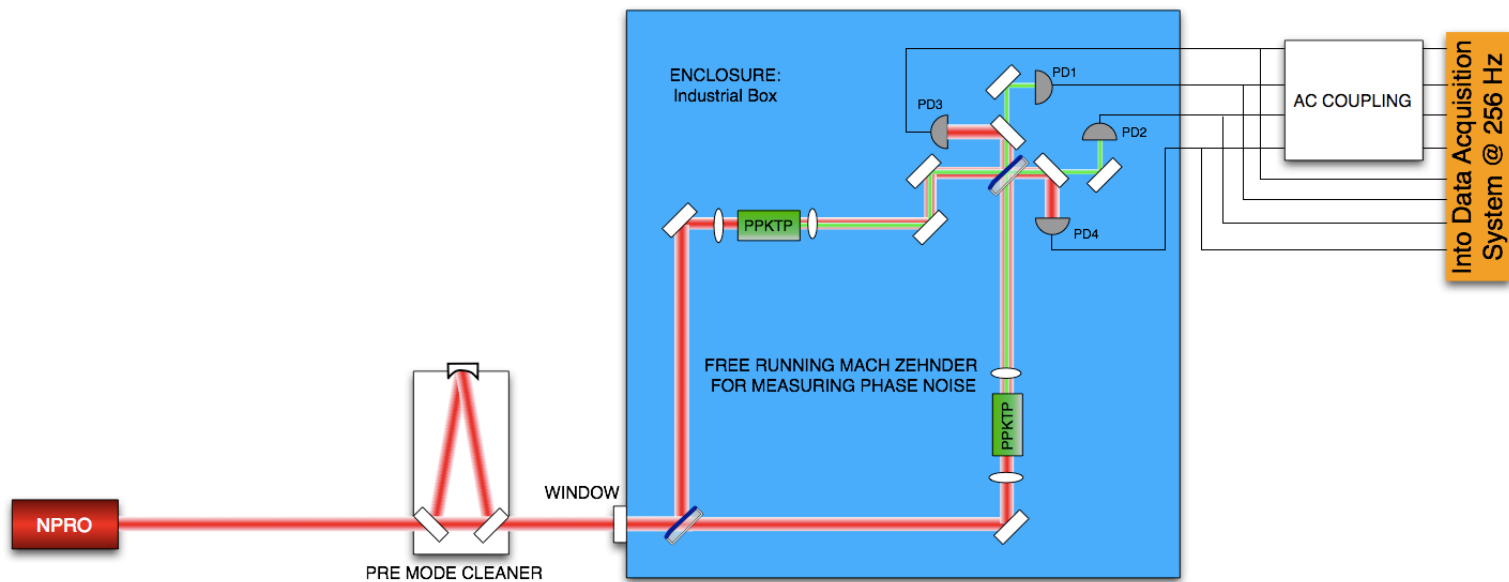


# Mach Zehnder ATF Etc

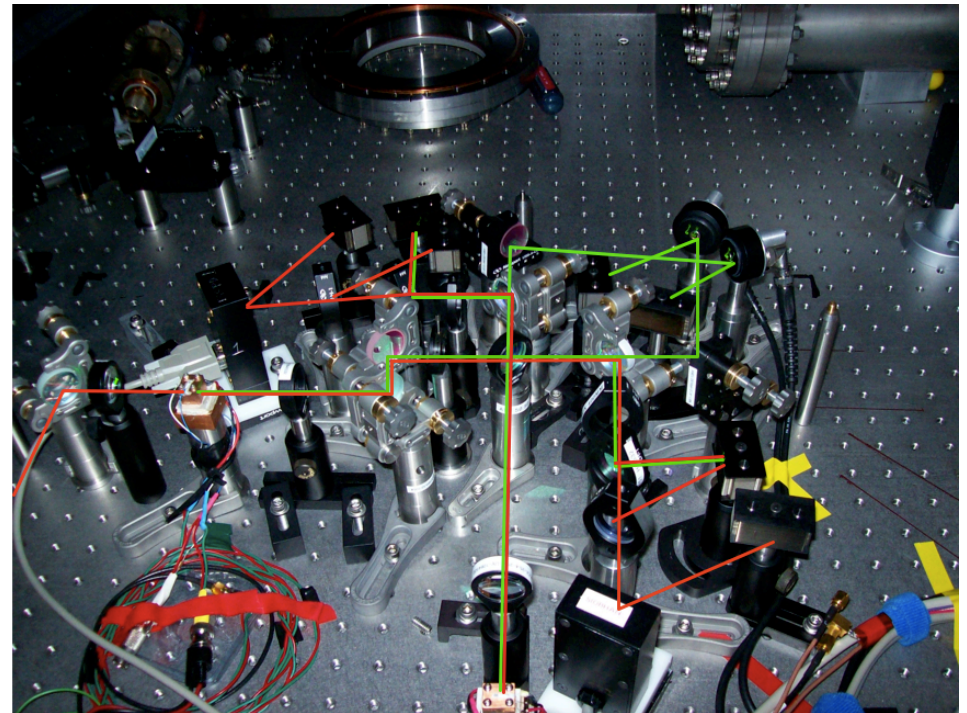
by al et dmass

- We are trying to measure the phase noise added to a field in the doubling process
- Clock people may want to use (ref Bergquist?) harmonic generation in nonlinear crystals in future schemes
- We want to demonstrate a bound on frequency noise in the band of interest which shows the doubling won't be limiting for frequency stability (for a bit)
- Ligo interested b/c DRBROOKS



# Procedure!

- Use a Mach Zehnder IFO
- Double in each arm
- I stabilize PD sum (Intensity Servo)
- Lock difference in IR
- Look at difference in green for “phase noise”
- (Subtraction?) unsure if this will be in final rev



# Conclusions

- The noise excess so far may be IR scatter – under investigation
- We are at around  $10^{-18}$   $\Delta f_{\text{rms}} / f$  in the 10 mHz to 100 Hz band
- I expect this to go down, but this may be “good enough”
- Like all experiments, terrible, but probably publishable

