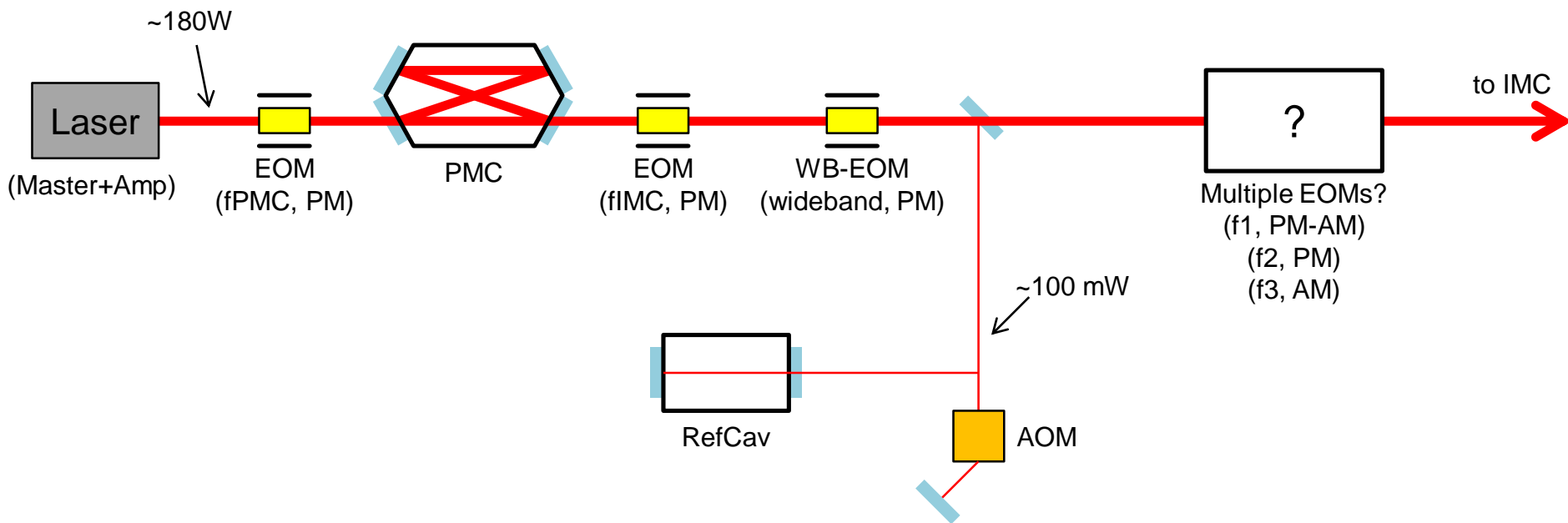


# bKAGRA PSL EOM Layout



- Modulation frequencies and requirements for modulations

[JGW/wiki/MIFIOOInterfaces](http://JGW/wiki/MIFIOOInterfaces)

- Abbreviations

EOM: electro-optic modulator

PM: phase modulation

AM: amplitude modulation

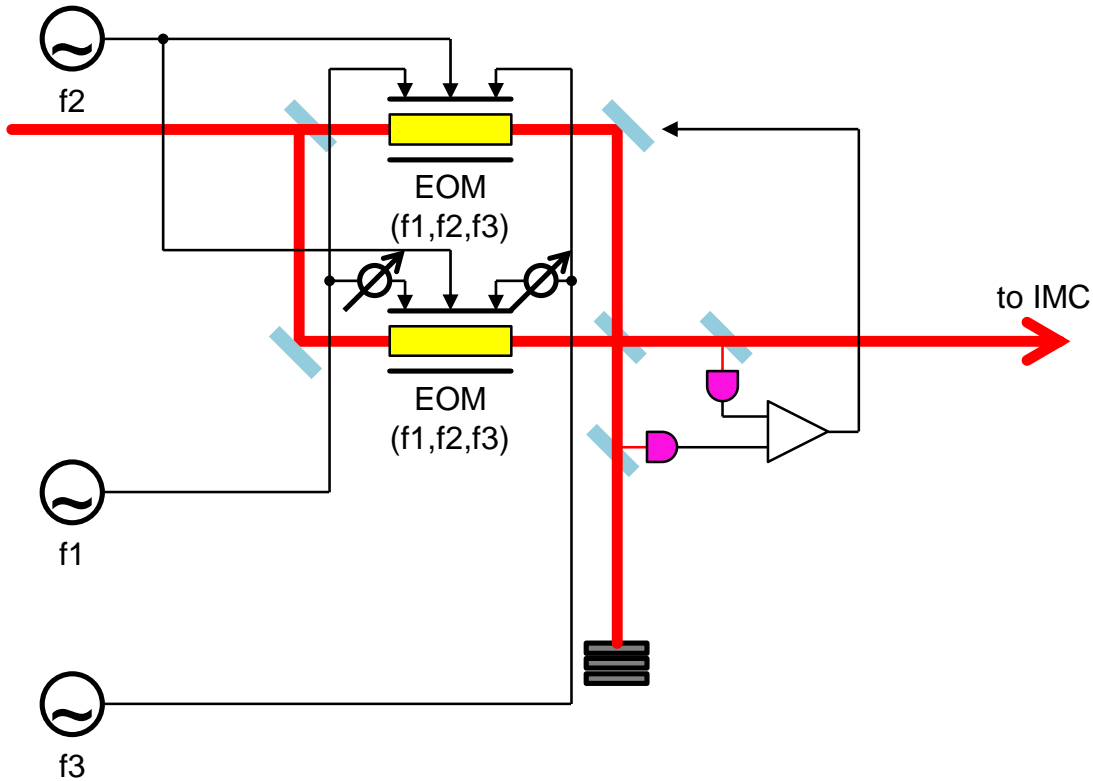
WB: wideband

# Requirements for f1, f2, f3

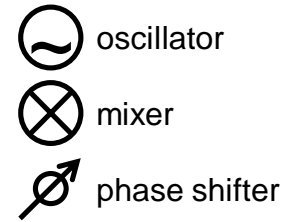
- f1 PM and AM (ratio should be adjusted with respect to detuning)
- f2 PM only
- f3 AM only (turned off once the IFO is locked)
- Series modulation is OK
- Detailed requirements are summarized in [JGWwiki/MIFIOOInterfaces](http://JGWwiki/MIFIOOInterfaces)

# Layout 1

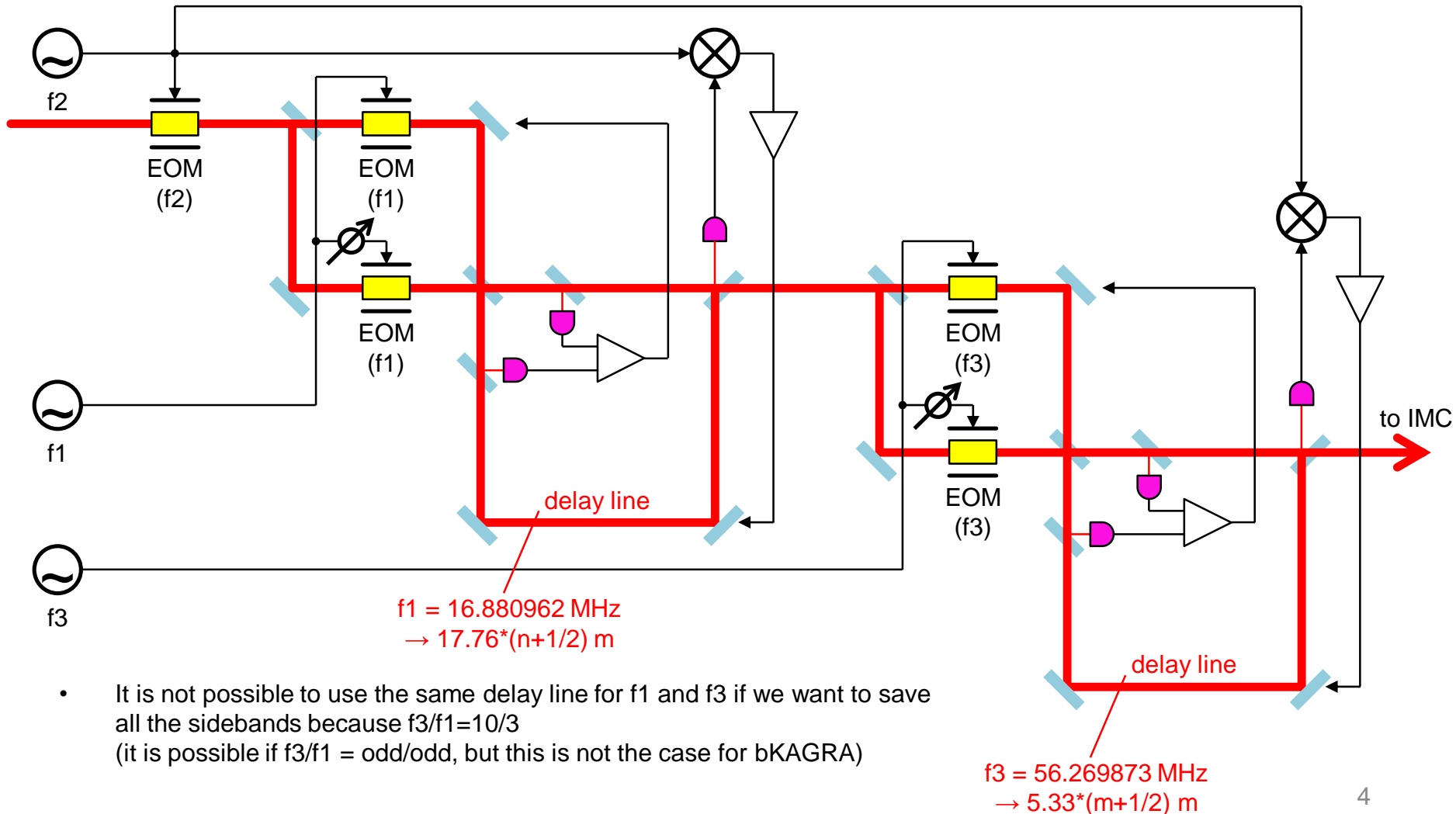
- Simple but lose half the power



# Layout 2



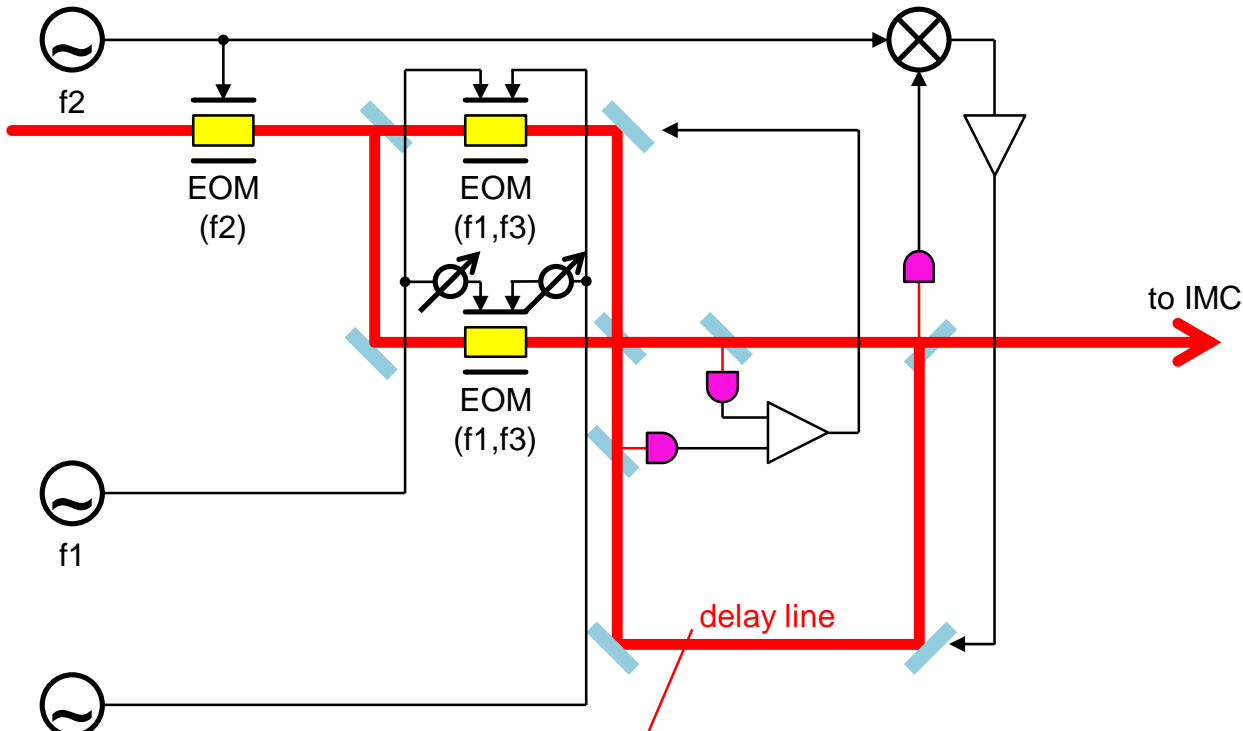
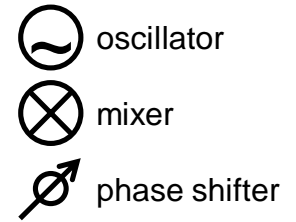
- Saves the whole power



- It is not possible to use the same delay line for  $f_1$  and  $f_3$  if we want to save all the sidebands because  $f_3/f_1 = 10/3$  (it is possible if  $f_3/f_1 = \text{odd/odd}$ , but this is not the case for bKAGRA)

# Layout 3

- Simpler, but loses some f3 AM

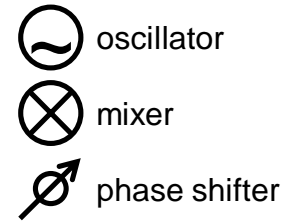


$f1 = 16.880962 \text{ MHz}$   
 $\rightarrow 17.76 * 1/2 = 8.88 \text{ m}$

$\rightarrow 2.66 \text{ m}$

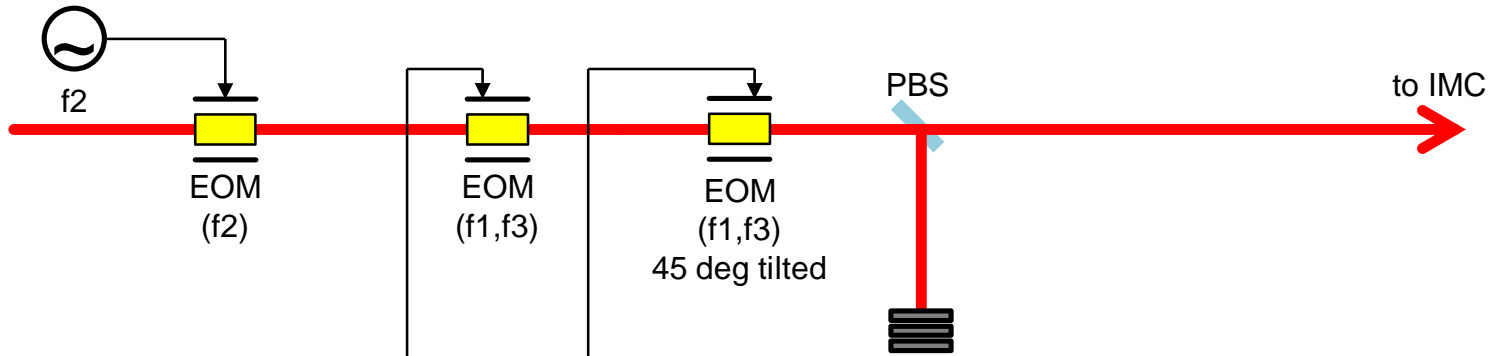
(see [JGW-T1706748](#))

# Layout 3.5



- Possible configuration for bKAGRA Phase 1?

→ NO



- EOM has wedges and AM generation is not possible with wedged EOM (even with two EOMs)
- AM generation with tilted EOM requires severe temperature control
- Possible effect on interferometer controls due to unwanted f3 PM (we can cancel f3 PM with two EOMs, but we don't have enough EOMs) and unwanted f2,f1 AM