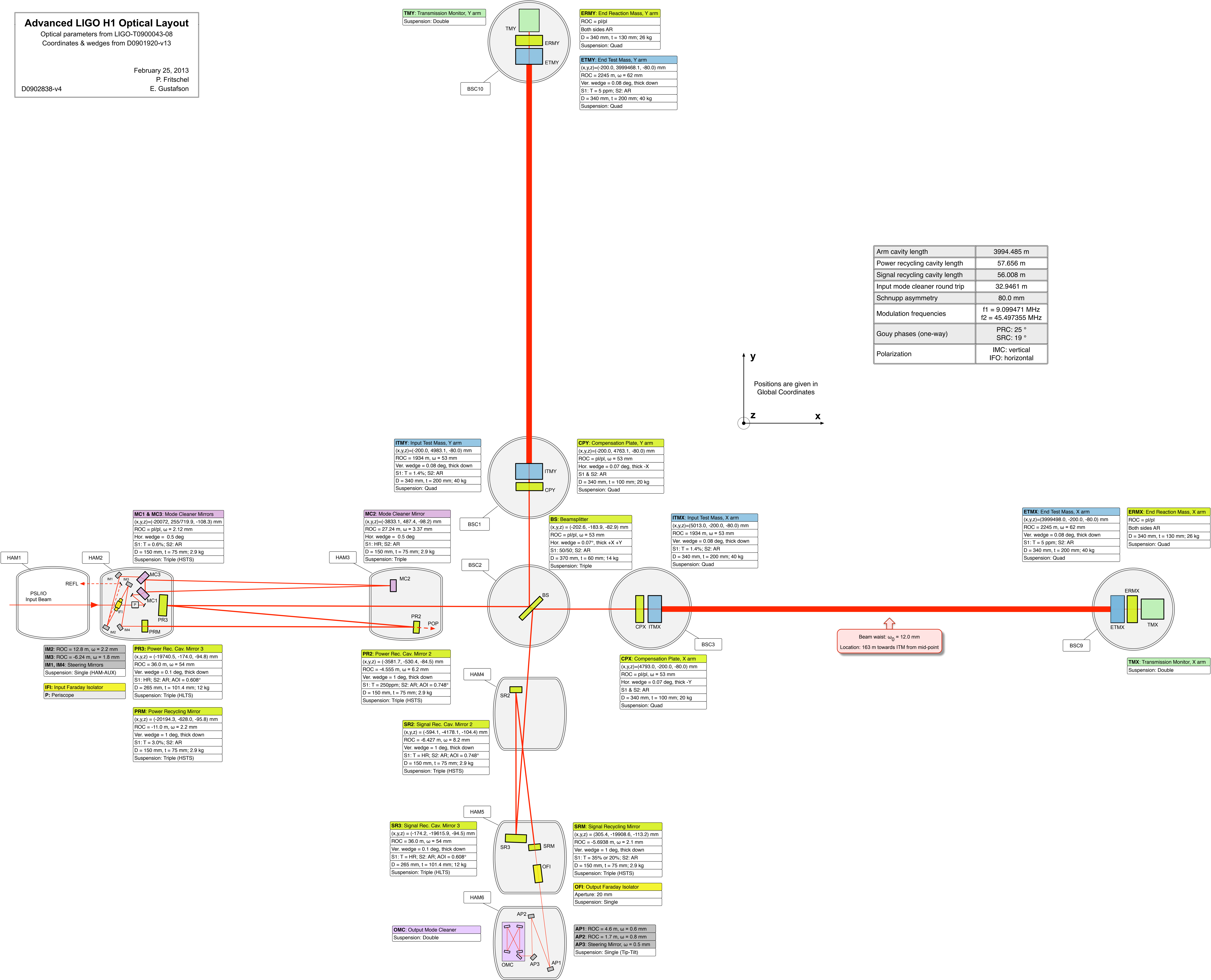


# Advanced LIGO H1 Optical Layout

Optical parameters from LIGO-T0900043-08  
Coordinates & wedges from D0901920-v13

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D0902838-v4



**ERMV: End Reaction Mass, Y arm**

ROC = pi/pi
Both sides AR
D = 340 mm, t = 130 mm; 26 kg
Suspension: Quad

**ETMY: End Test Mass, Y arm**

(x,y,z)=(-200.0, 3999468.1, -80.0) mm
ROC = 2245 m, $\omega = 62$ mm
Ver. wedge = 0.08 deg, thick down
S1: T = 5 ppm; S2: AR
D = 340 mm, t = 200 mm; 40 kg
Suspension: Quad

**TMY: Transmission Monitor, Y arm**

Suspension: Double
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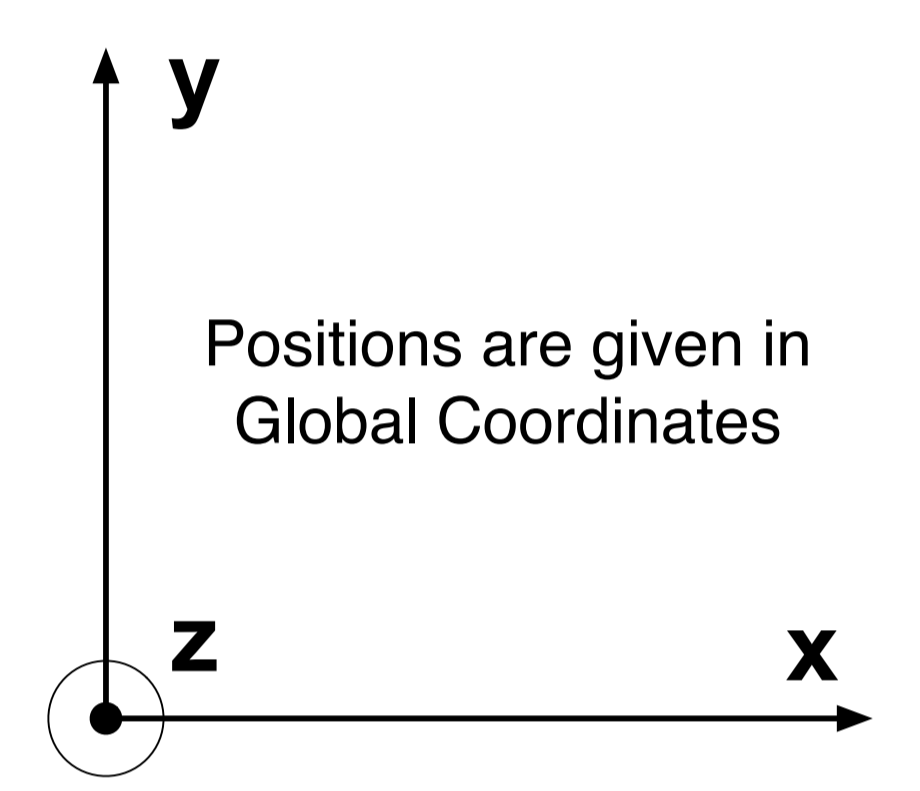
**ITMY: Input Test Mass, Y arm**

(x,y,z)=(-200.0, 4983.1, -80.0) mm
ROC = 1934 m, $\omega = 53$ mm
Ver. wedge = 0.08 deg, thick down
S1: T = 1.4%; S2: AR
D = 340 mm, t = 200 mm; 40 kg
Suspension: Quad

**CPY: Compensation Plate, Y arm**

(x,y,z)=(-200.0, 4763.1, -80.0) mm
ROC = pi/pi, $\omega = 53$ mm
Hor. wedge = 0.07 deg, thick -X
S1 & S2: AR
D = 340 mm, t = 100 mm; 20 kg
Suspension: Quad

Arm cavity length	3994.485 m
Power recycling cavity length	57.656 m
Signal recycling cavity length	56.008 m
Input mode cleaner round trip	32.9461 m
Schnupp asymmetry	80.0 mm
Modulation frequencies	f1 = 9.099471 MHz f2 = 45.497355 MHz
Gouy phases (one-way)	PRC: 25 ° SRC: 19 °
Polarization	IMC: vertical IFO: horizontal



**MC1 & MC3: Mode Cleaner Mirrors**

(x,y,z)=(-2007.2, 2557719.9, -108.3) mm
ROC = pi/pi, $\omega = 2.12$ mm
Hor. wedge = 0.5 deg
S1: T = 0.6%; S2: AR
D = 150 mm, t = 75 mm; 2.9 kg
Suspension: Triple (HSTS)

**MC2: Mode Cleaner Mirror**

(x,y,z)=(-3833.1, 487.4, -98.2) mm
ROC = 27.24 m, $\omega = 3.37$ mm
Hor. wedge = 0.5 deg
S1: HR; S2: AR
D = 150 mm, t = 75 mm; 2.9 kg
Suspension: Triple

**BS: Beamsplitter**

(x,y,z) = (-202.6, -183.9, -82.9) mm
ROC = pi/pi, $\omega = 53$ mm
Hor. wedge = 0.07°, thick +X +Y
S1: 50/50; S2: AR
D = 370 mm, t = 60 mm; 14 kg
Suspension: Triple

**ITMX: Input Test Mass, X arm**

(x,y,z)=(5013.0, -200.0, -80.0) mm
ROC = 1934 m, $\omega = 53$ mm
Ver. wedge = 0.08 deg, thick down
S1: T = 1.4%; S2: AR
D = 340 mm, t = 200 mm; 40 kg
Suspension: Quad

**ETMX: End Test Mass, X arm**

(x,y,z)=(3999498.0, -200.0, -80.0) mm
ROC = 2245 m, $\omega = 62$ mm
Ver. wedge = 0.08 deg, thick down
S1: T = 5 ppm; S2: AR
D = 340 mm, t = 200 mm; 40 kg
Suspension: Quad

**ERMV: End Reaction Mass, X arm**

ROC = pi/pi
Both sides AR
D = 340 mm, t = 130 mm; 26 kg
Suspension: Quad

**IM2: ROC = 12.8 m,  $\omega = 2.2$  mm**

**IM3: ROC = -6.24 m,  $\omega = 1.8$  mm**

**IM1, IM4: Steering Mirrors**

Suspension: Single (HAM-AUX)

**PR3: Power Rec. Cav. Mirror 3**

(x,y,z) = (-19740.5, -174.0, -94.8) mm
ROC = 36.0 m, $\omega = 54$ mm
Ver. wedge = 0.1 deg, thick down
S1: HR; S2: AR; AOI = 0.608°
D = 265 mm, t = 101.4 mm; 12 kg
Suspension: Triple (HLTS)

**PR2: Power Rec. Cav. Mirror 2**

(x,y,z) = (-3581.7, -530.4, -94.5) mm
ROC = -4.555 m, $\omega = 6.2$ mm
Ver. wedge = 1 deg, thick down
S1: T = 250ppm; S2: AR; AOI = 0.748°
D = 150 mm, t = 75 mm; 2.9 kg
Suspension: Triple (HSTS)

**SR2: Signal Rec. Cav. Mirror 2**

(x,y,z) = (-594.1, -4176.1, -104.4) mm
ROC = -6.427 m, $\omega = 8.2$ mm
Ver. wedge = 1 deg, thick down
S1: T = HR; S2: AR; AOI = 0.748°
D = 150 mm, t = 75 mm; 2.9 kg
Suspension: Triple (HSTS)

**CPX: Compensation Plate, X arm**

(x,y,z)=(4793.0, -200.0, -80.0) mm
ROC = pi/pi, $\omega = 53$ mm
Hor. wedge = 0.07 deg, thick -Y
S1 & S2: AR
D = 340 mm, t = 100 mm; 20 kg
Suspension: Quad

**SR3: Signal Rec. Cav. Mirror 3**

(x,y,z) = (-174.2, -19615.9, -94.5) mm
ROC = 36.0 m, $\omega = 54$ mm
Ver. wedge = 0.1 deg, thick down
S1: T = HR; S2: AR; AOI = 0.608°
D = 265 mm, t = 101.4 mm; 12 kg
Suspension: Triple (HLTS)

**SRM: Signal Recycling Mirror**

(x,y,z) = (305.4, -19908.6, -113.2) mm
ROC = -5.6938 m, $\omega = 2.1$ mm
Ver. wedge = 1 deg, thick down
S1: T = 35% or 20%; S2: AR
D = 150 mm, t = 75 mm; 2.9 kg
Suspension: Triple (HSTS)

**OPI: Output Faraday Isolator**

Aperture: 20 mm
Suspension: Single

**OMC: Output Mode Cleaner**

Suspension: Double
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**AP1: ROC = 4.6 m,  $\omega = 0.6$  mm**

**AP2: ROC = 1.7 m,  $\omega = 0.8$  mm**

**AP3: Steering Mirror,  $\omega = 0.5$  mm**

Suspension: Single (Tip-Tilt)

Beam waist:  $\omega_0 = 12.0$  mm  
Location: 163 m towards ITM from mid-point

**TMX: Transmission Monitor, X arm**

Suspension: Double
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