



# Summary

[ forget and don't ask what Hiro said before ]

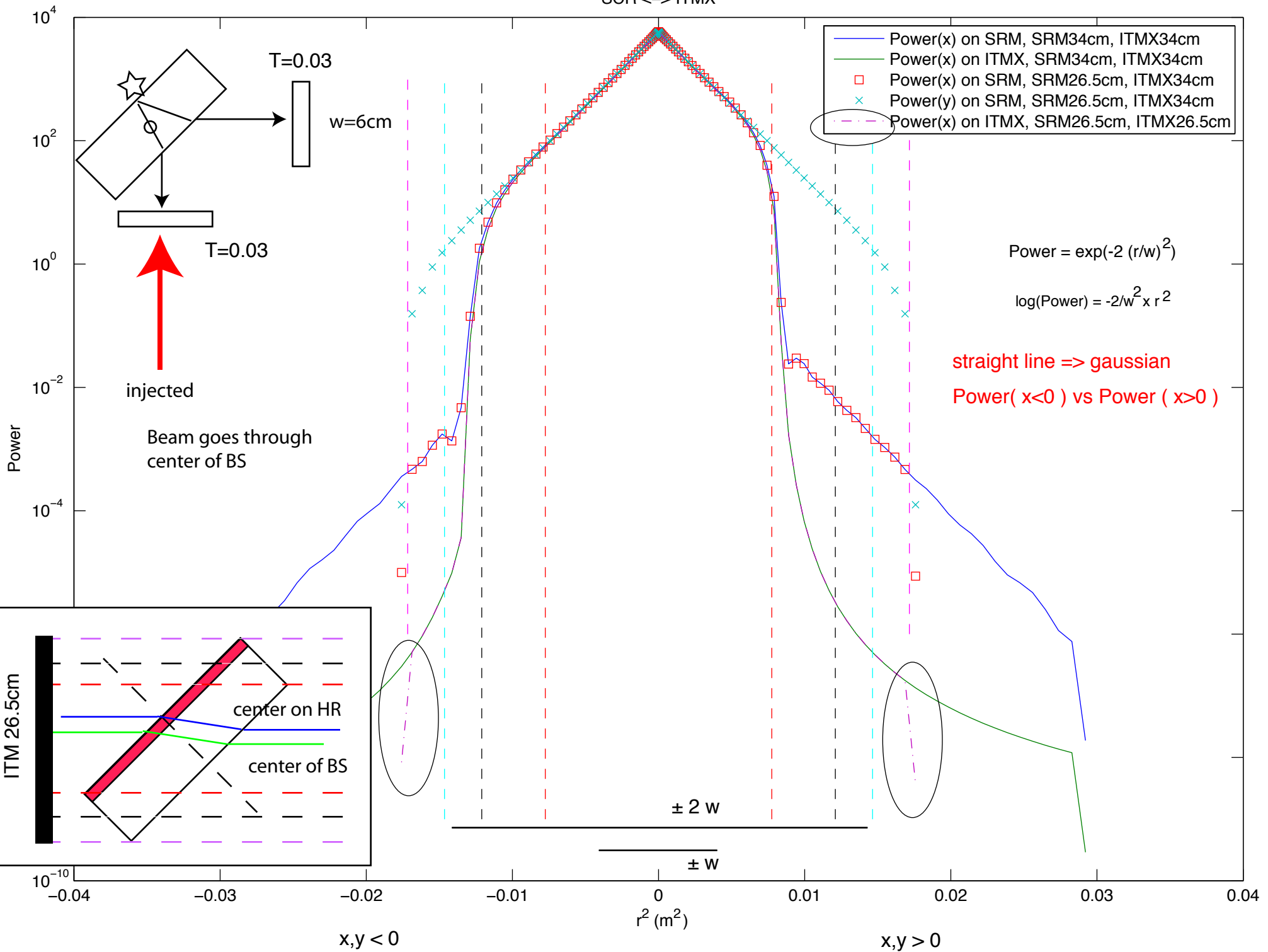
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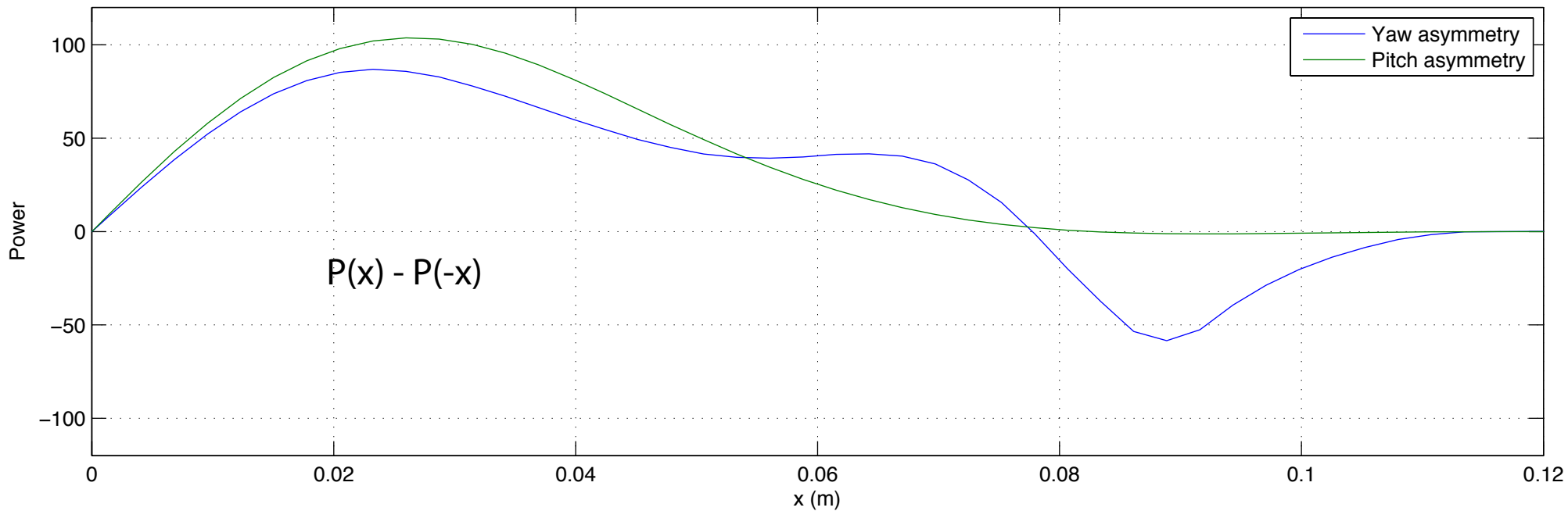
- BS : aperture 37cm, thickness 6cm, flat 9 cm
  - » In Michelson cavity : Power loss < 40ppm, TEM00 mode loss < 30ppm
  - » Need full simulation to get accurate value
- RM aperture 26.5cm
  - » No additional loss
  - » 1cm shift is tolerant
- ITM with clear aperture 26.5cm
  - » Same as RM
  - » ESD can cover radius > 13cm
- Beam is better to hit the center of HR surface, rather than going through the center of BS
  - » Resonating field in the signal recycling cavity is more symmetric
- Asymmetry introduced by BS is not harmful for ASC
- Curvature tolerance of RM is very stringent for advLIGO unstable cavity
- Writing T070052-00-E

*COC April, 18, 2007*

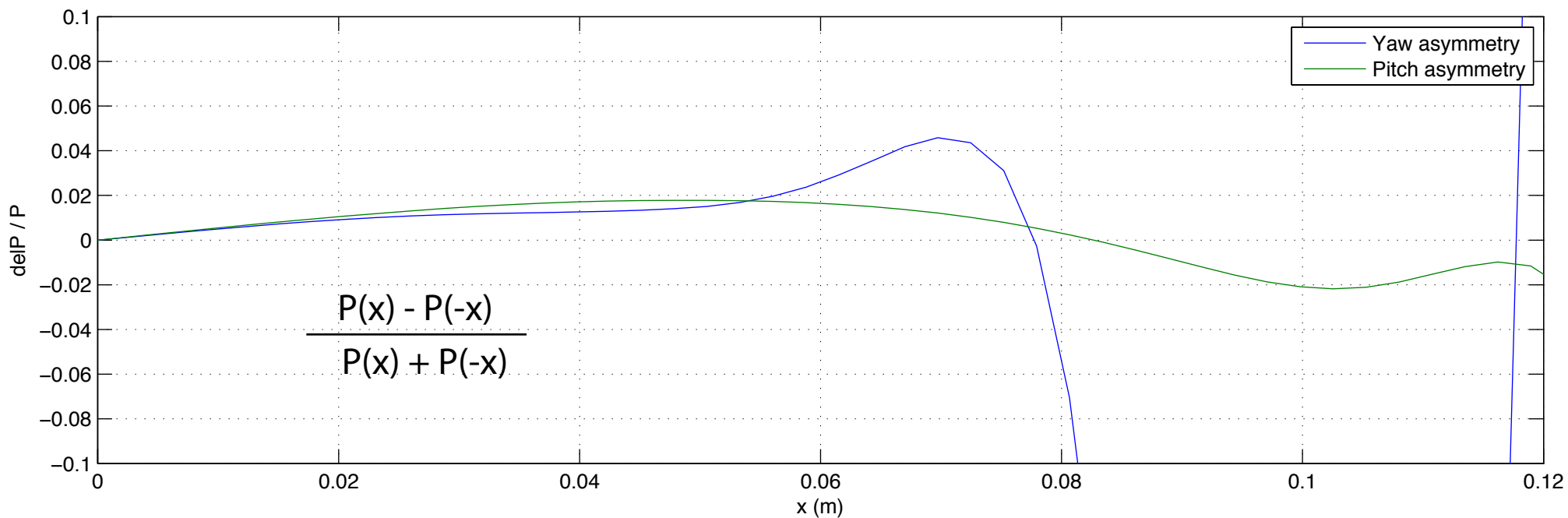
BS : 37cm, 6cm thick, 9cm flat

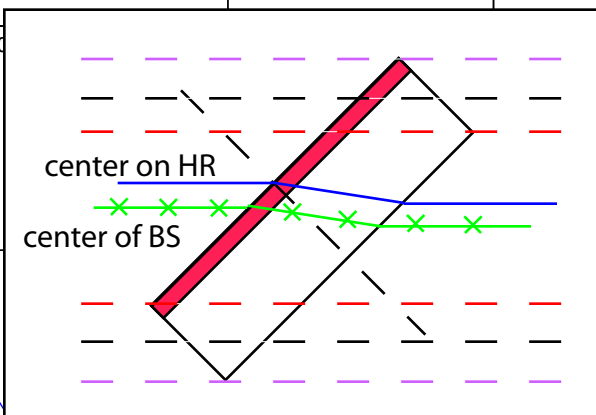
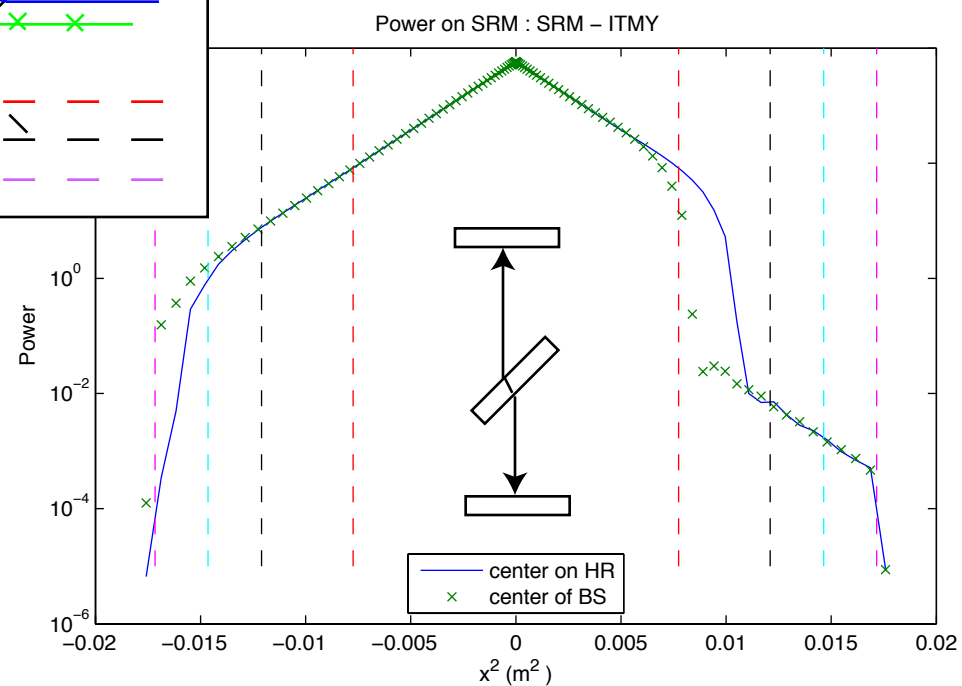
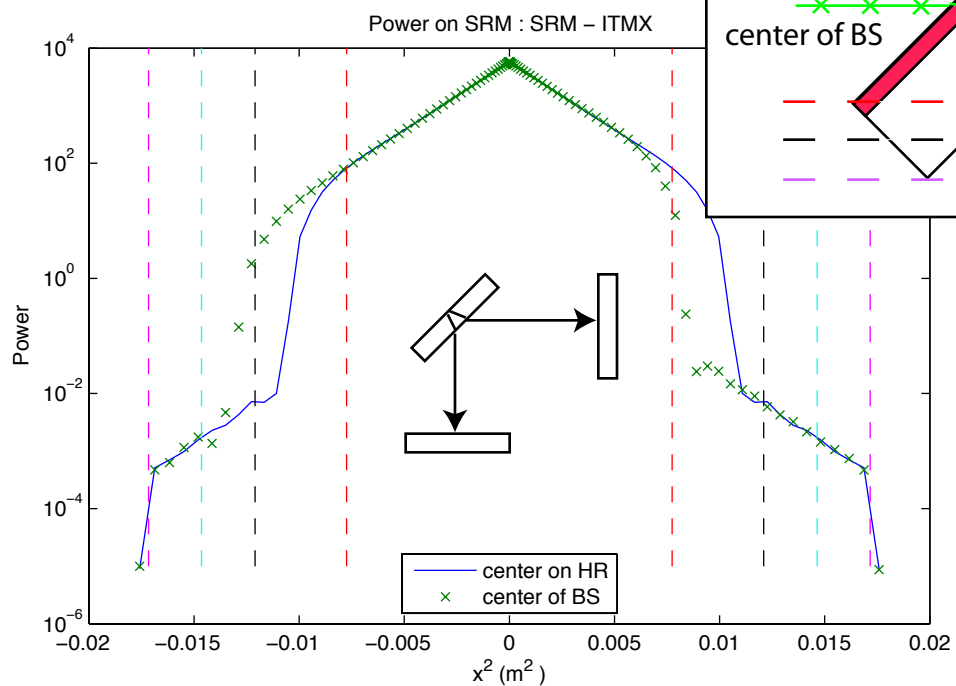
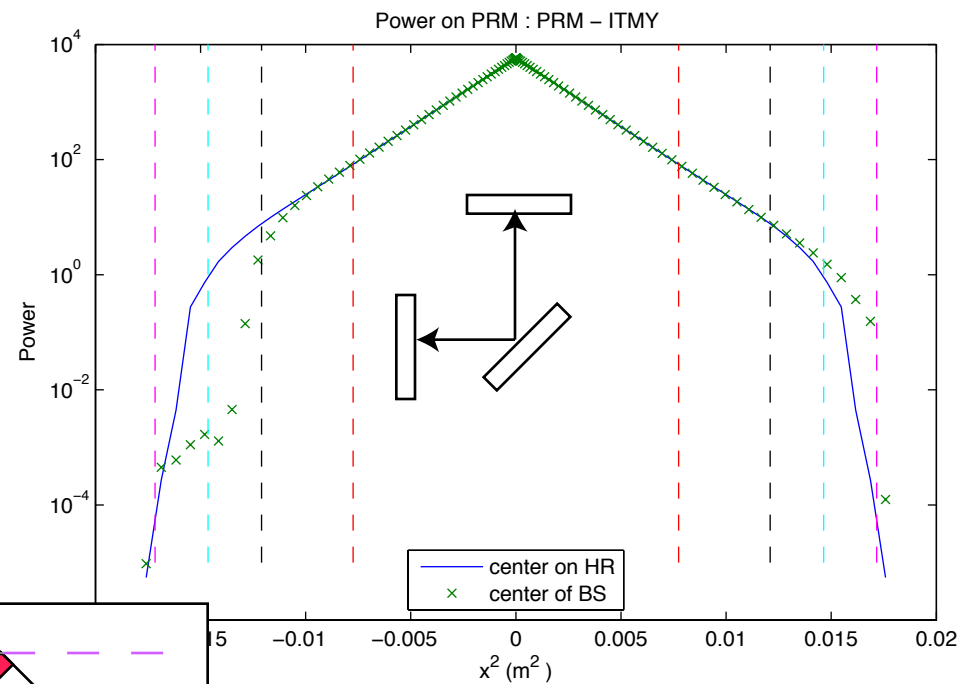
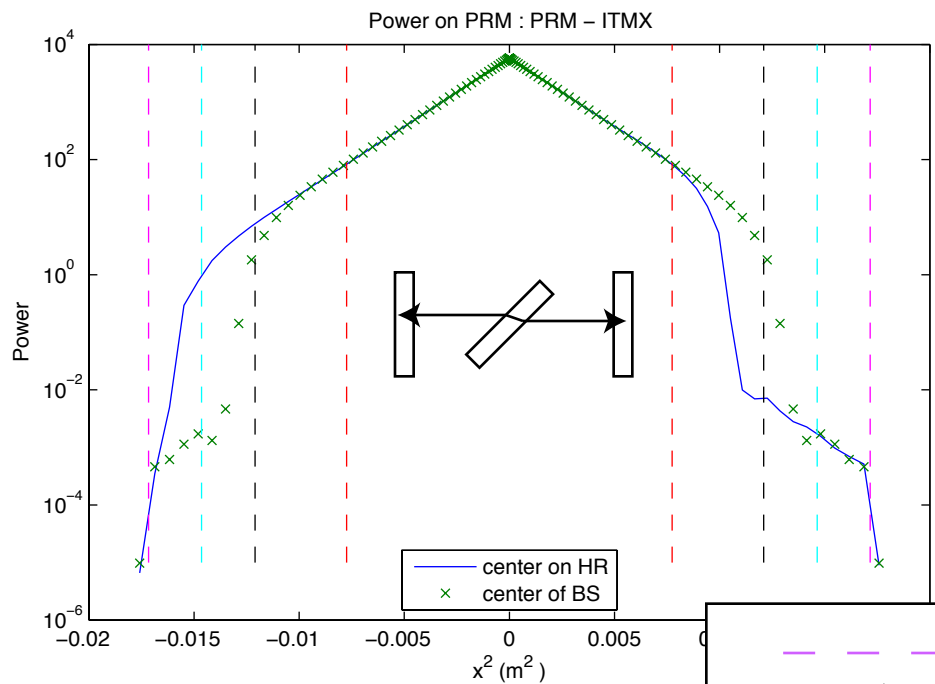
SCR <-> ITMX





tilt =  $10^{-8}$  rad





# Curvature tolerance for Recycling cavity mirror

$$w_2^4 = \left( \frac{L\lambda}{\pi} \right)^2 \frac{g_1}{1 - g_1 g_2}$$

$$g_1 = \frac{w_2^4}{\left( \frac{L\lambda}{\pi} \right)^2 + w_2^4 g_2} = 1 - \frac{L}{R_1}$$

$$R_1 = R_1^0 + \delta$$

$$\delta w_2 [cm] \approx L \left( \frac{\pi}{L\lambda} \right)^2 \frac{w_2^5}{R_1^2} \delta = 40 \cdot \delta [m] \quad \text{for } \textit{adv.LIGO}$$

$$\delta w_2 [cm] (\textit{LIGO I}) = \left( \frac{0.035}{0.06} \right)^5 \left( \frac{2076}{14000} \right)^2 \delta w_2 [cm] (\textit{advLIGO}) = 0.0015 \cdot \delta w_2 [cm] (\textit{advLIGO})$$

$R_1 \rightarrow R_1^0 + \delta$

$R_2$



$w_2 \rightarrow w_2^0 + \delta w_2$