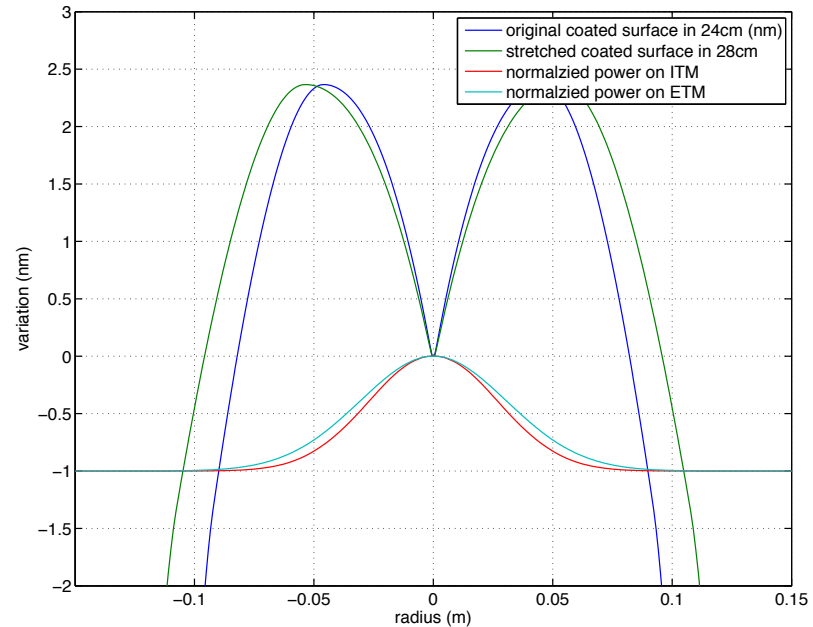
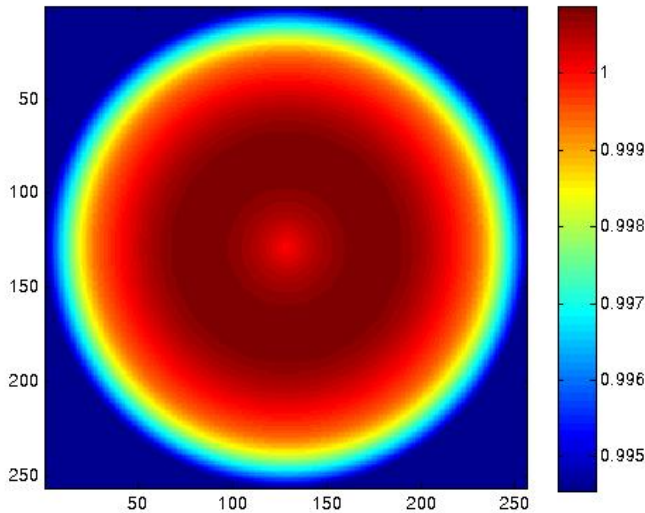




LMA Coating non uniformity on aLIGO optics



ITM	ETM	loss (ppm)
x 1	x 0	8
x 0	x 1	10
x 0	x 2	42
x 1	x 1	17
x 1	x 2	47
x 0.8	x 1.6	30

Power weighted RMS
 0.6nm on ITM, 0.9nm on ETM
 Cusp removed in $r < 5\text{mm}$ by a constant
 loss = 44ppm
 Loss (ITMx1,ETMx2) with stretch
 24ppm to 26cm (+8%)
 12ppm to 28cm (+15%)



LMA Coating non uniformity on aLIGO optics

- If the high spatial component is of similar shape as the polished surface indicated by the estimation based on the LASTI AR coating, the additional loss from the high spatial frequency will be 5ppm/mirror at most.
- Cusp at the center is not a big issue as it looks like.
- 20ppm is the loss budge due to surface figure
- 5ppm or so is used by polished surface roughness
- loss due to the coating can be up to 30ppm per arm
- 47ppm per arm by the coating is not showstopper, but uncomfortable
- Either will reduce the loss to comfortable level
 - » reducing the thickness variation by 20% or
 - » the shoulder of the coating at around 7cm (still good energy of the beam on ETM with beam size of 6.2cm) outward by 10-20%

