# Fabrication of Bragg gratings in single mode silica fibers using phase mask and femtosecond pulses at 800 nm

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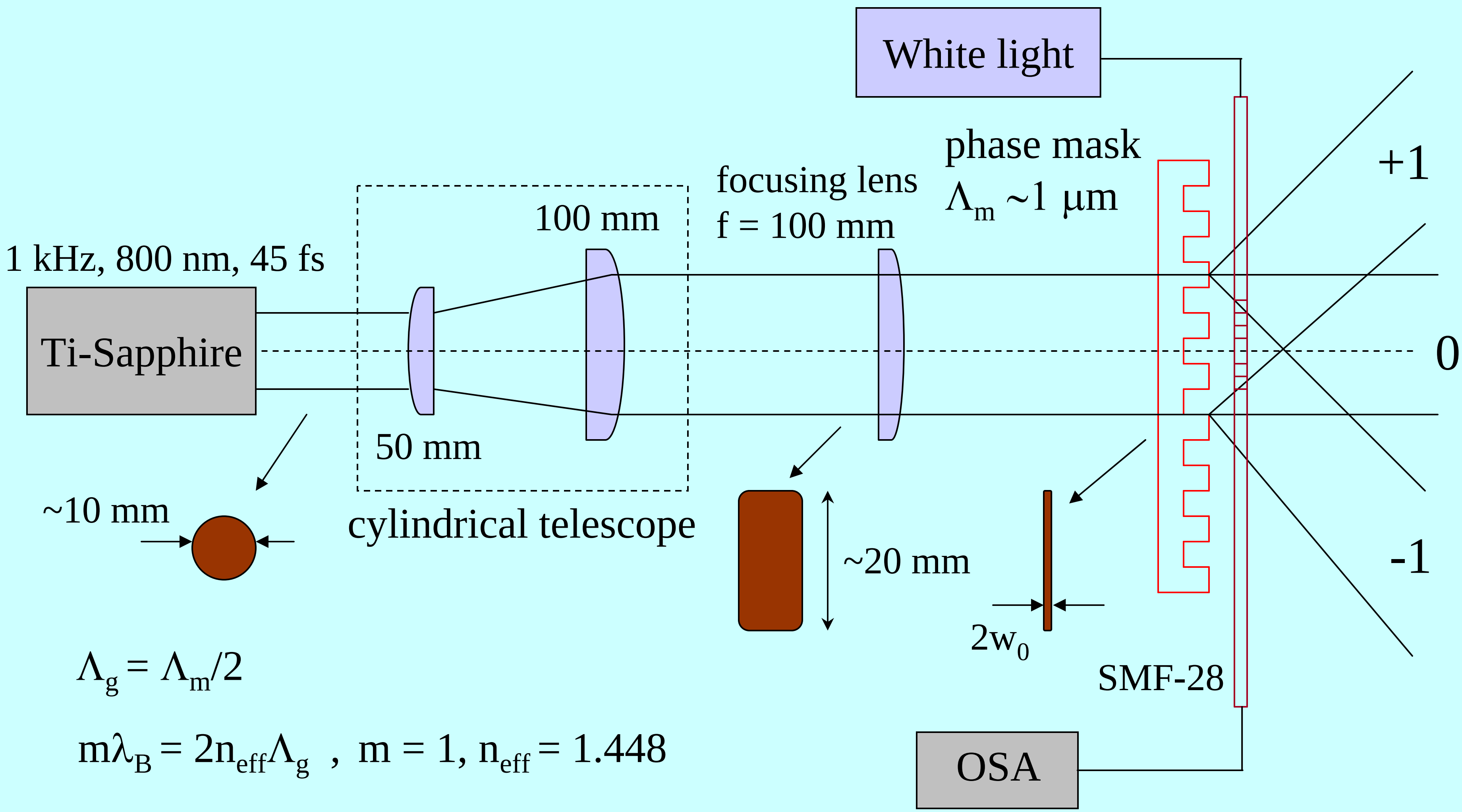
# Experimental setup

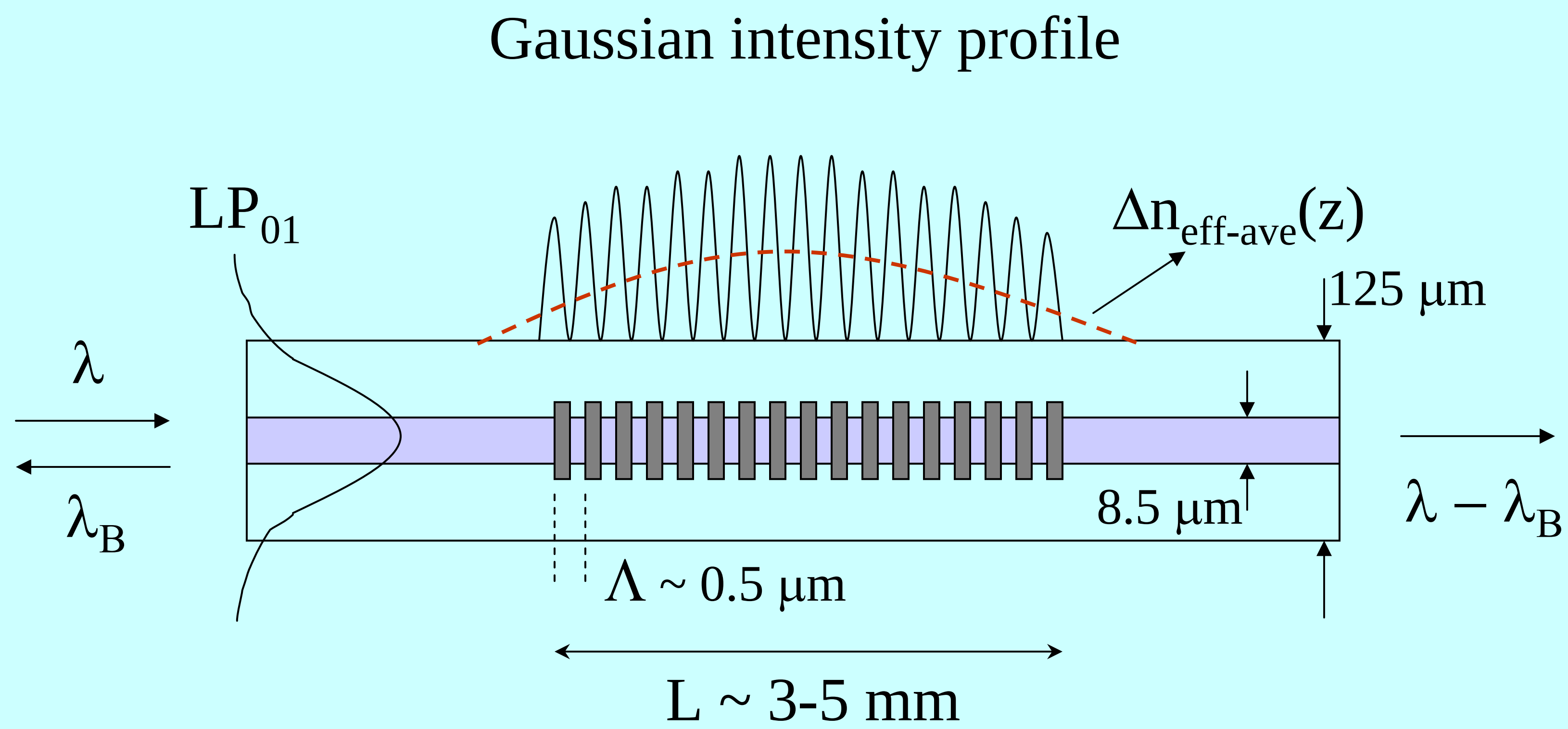



$\Lambda_g = \Lambda_m/2$

$m\lambda_B = 2n_{eff}\Lambda_g$ , $m = 1$, $n_{eff} = 1.448$

$2w_0 \sim 7\ \mu m$ (in fiber)

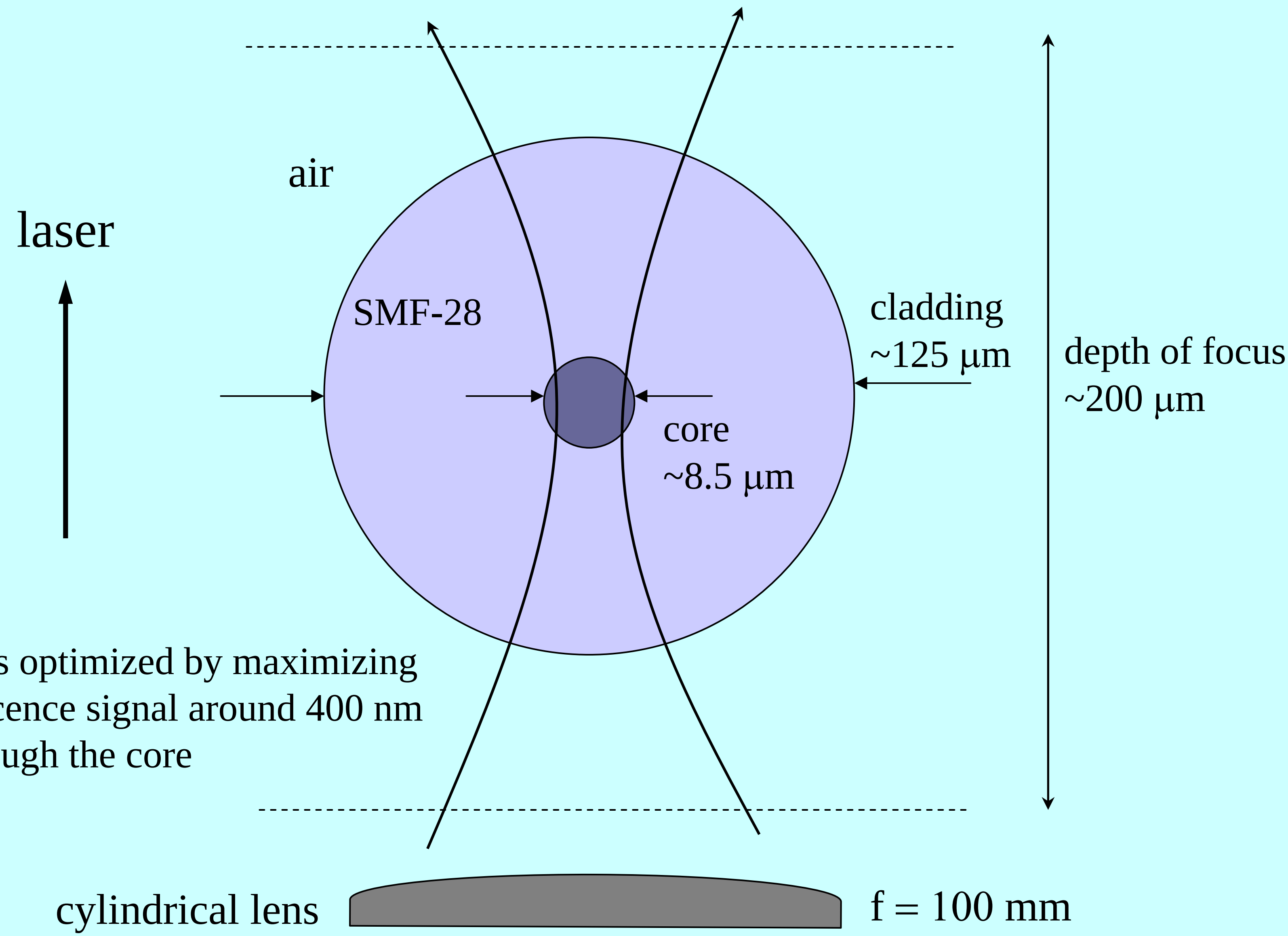
# FBG structure (non-uniform grating)




$\Delta n_{eff}(z) = \Delta n_{eff\text{-}ave}(z)[1+\nu\cos((2\pi/\Lambda)z+\phi(z))]$ $\nu$ = fringe visibility

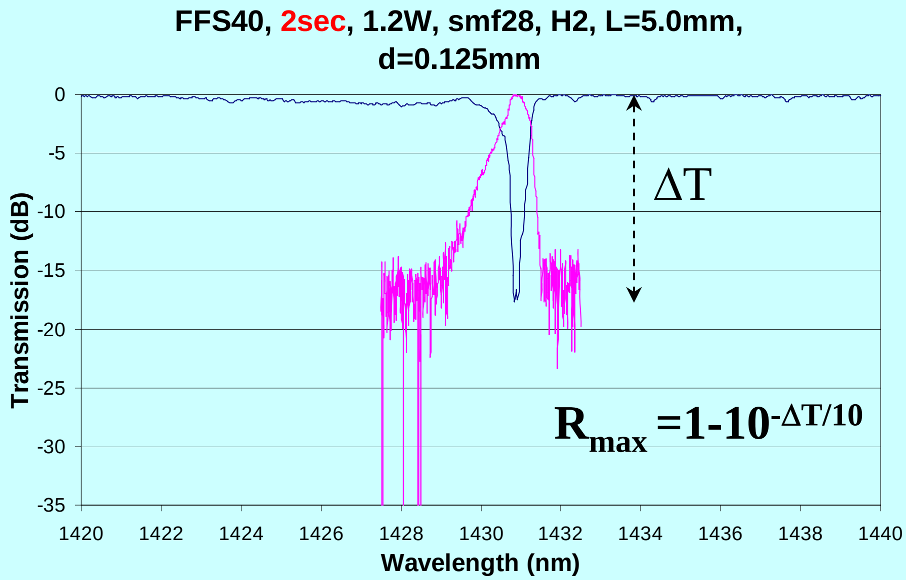
$R_{max} = \tanh^2(\kappa L)$, $\kappa = \pi\nu\Gamma\Delta n_{co}/\lambda$ (uniform grating) , $\Gamma$ = core confinement factor

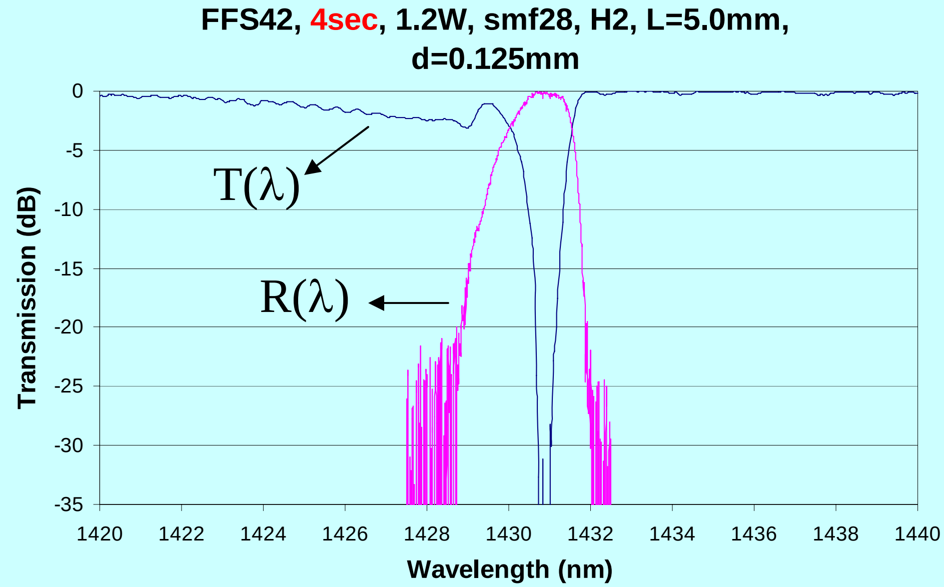
# Focusing geometry

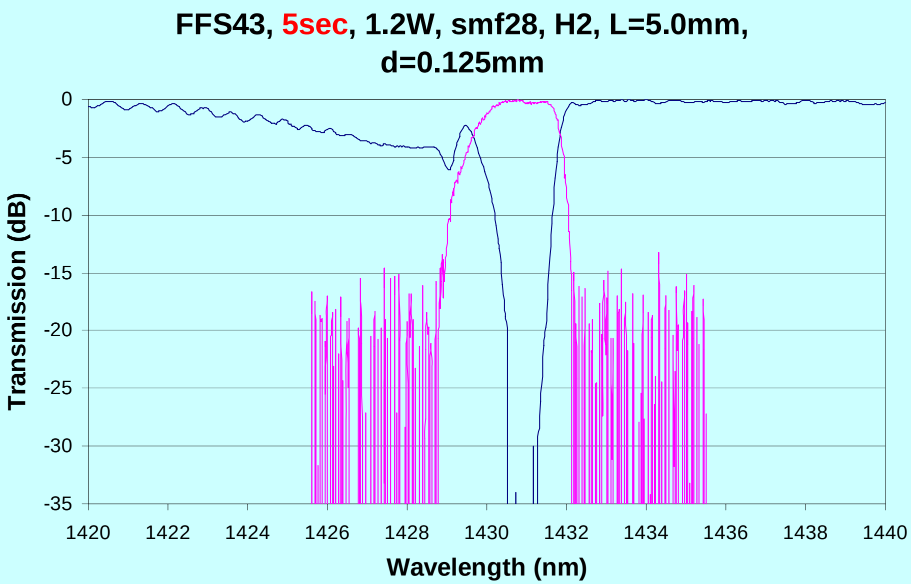


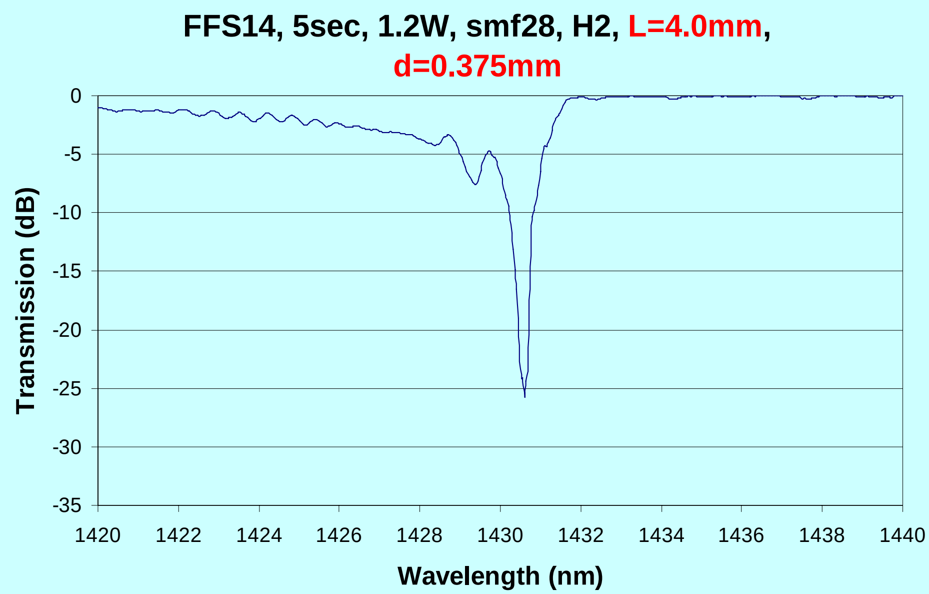

* alignment is optimized by maximizing the fluorescence signal around 400 nm guided through the core

# Spectral responses

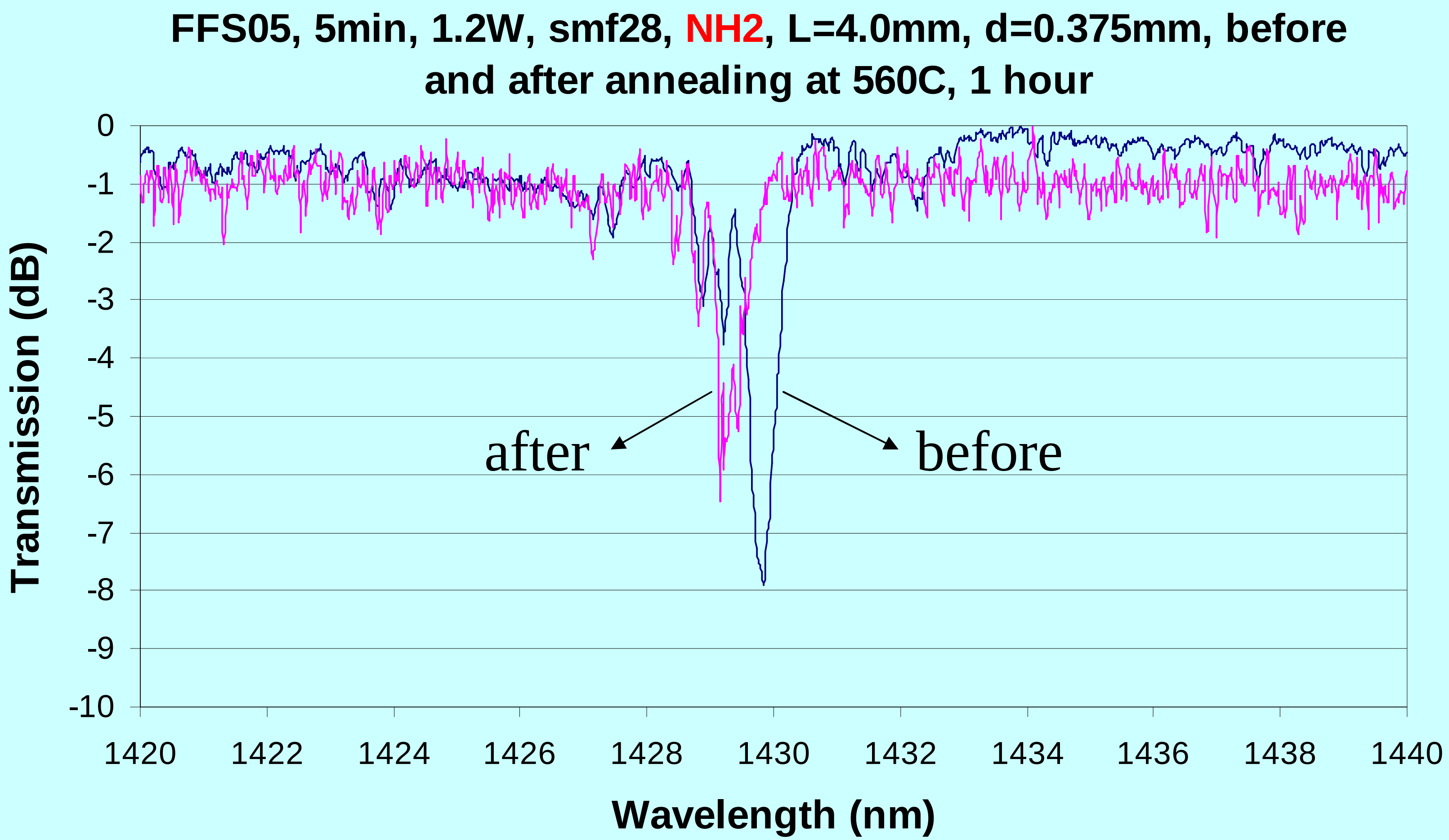


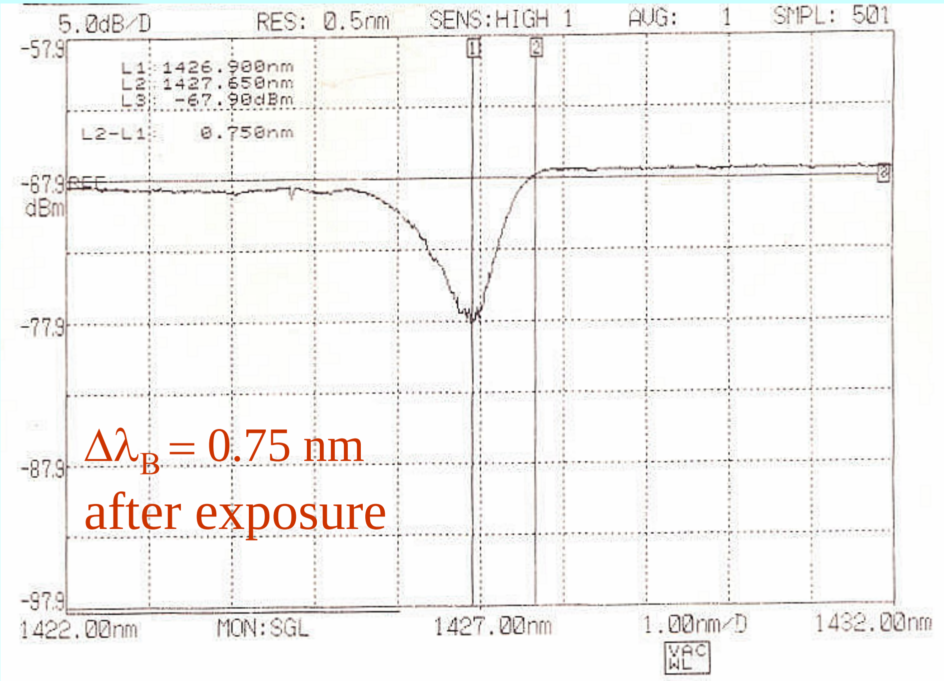



# Thermal stability

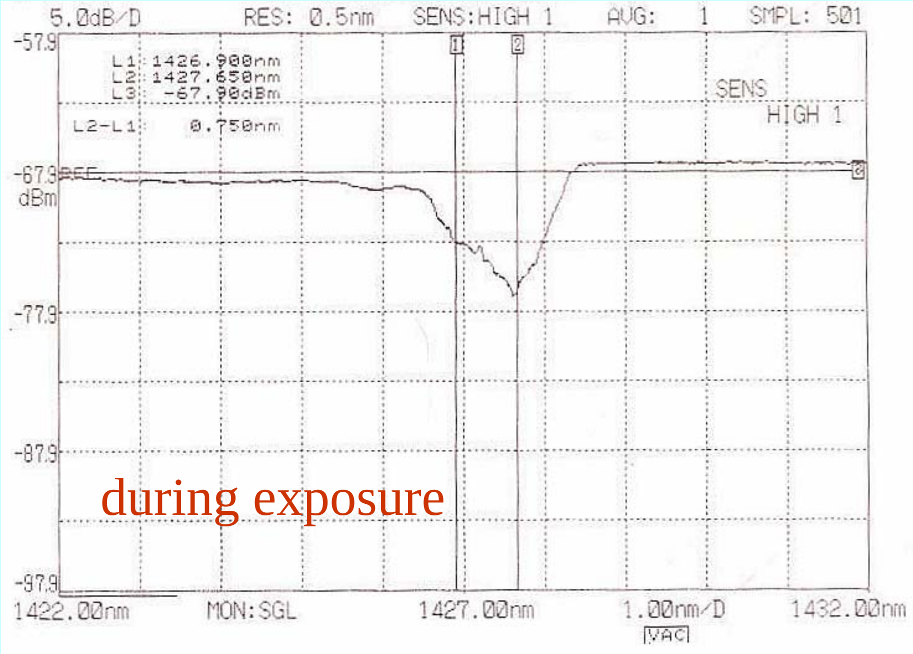


# Temperature-induced Bragg shift

500 μJ, NH2, d = 250 μm, 6 min




500 μJ, NH2, d = 250 μm, 6 min




$\Delta\lambda_B = 2n_{eff}\Lambda[\alpha + (dn_{eff}/dT)/n_{eff}]\Delta T$, $\alpha \sim +5.2 \times 10^{-7}\ {}^{o}C^{-1}$, $dn_{eff}/dT \sim +1.1 \times 10^{-5}\ {}^{o}C^{-1}$