

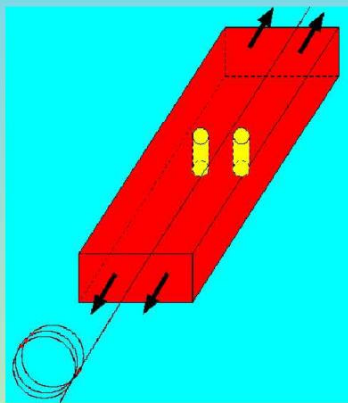
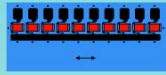
# MECHANICAL RESPONSE OF A FIBER BRAGG GRATING SENSOR IN A NON-UNIFORM STRESS FIELD

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## Candidate techniques for strain gradient measurement:

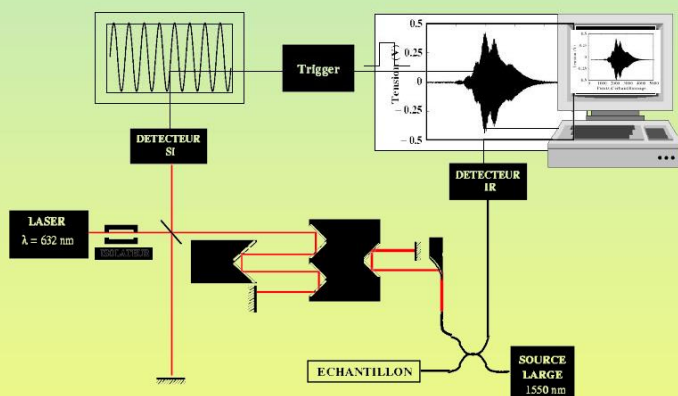
- Strip gages  
Space resolution 1mm  
Level resolution  $10^{-5}$
- Full field optical image correlation  
Space resolution  $<0.01\text{mm}$   
Level resolution  $10^{-4}$
- Fiber bragg Grating Sensor:  
Space resolution  $<0.001\text{mm}$   
Level resolution  $10^{-5}$



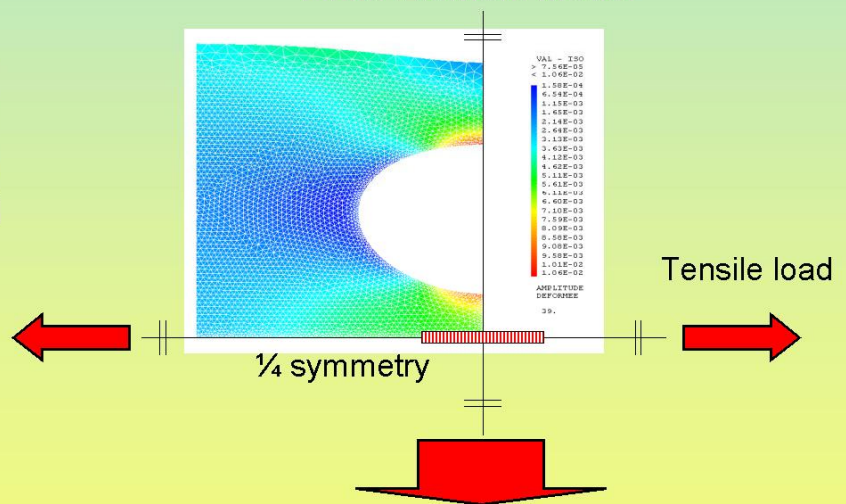
## Design of the test coupon:

- Coupon compatible with bonding of the optical fiber
- Fiber Bragg Grating located in the middle of a mould  
Respect of symmetry regarding the strain on the grating
- Epoxy resin filled under vacuum  
To avoid defects like air bubbles around the fiber
- Two holes drilled beside the grating  
Set-up of a smooth strain gradient
- Sample loaded in tension

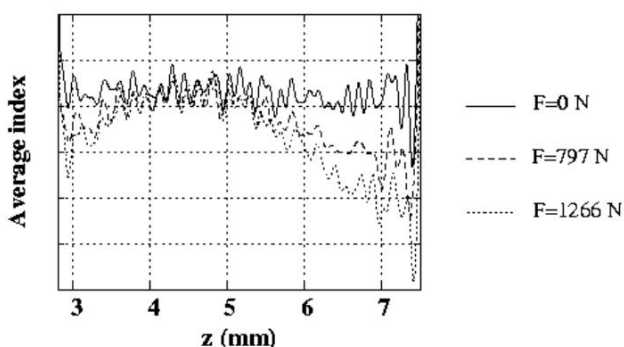
## Low Coherence Reflectometry



## Finite Element Model



## Result: Index profile



## Result: Strain profile

