

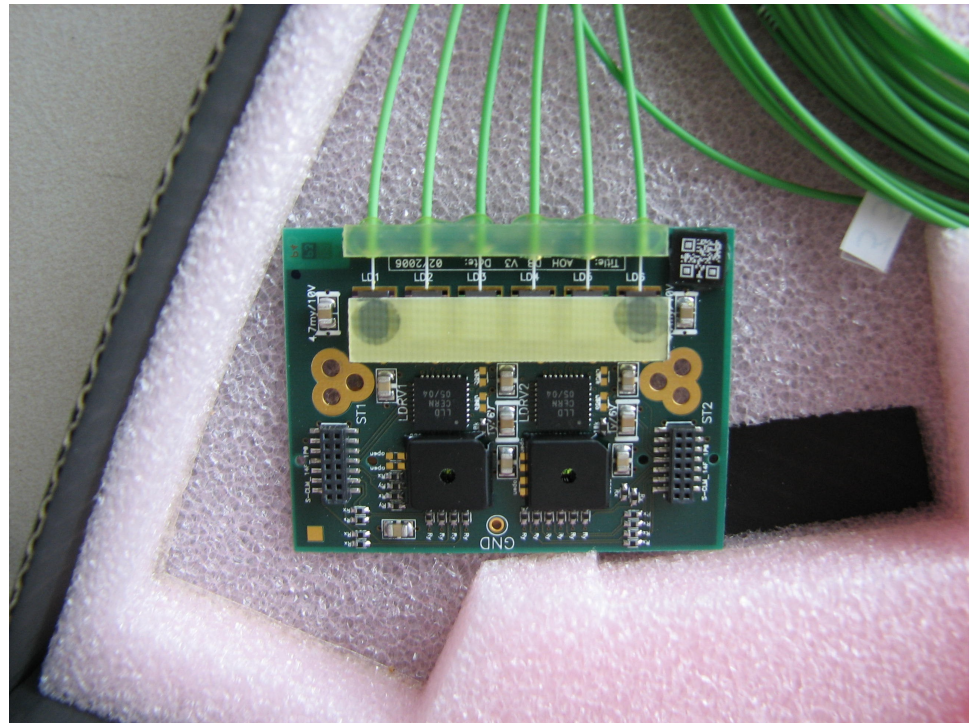
## AOH replacement

analog optical hybrid  
modification of the TkAOH  
6 lasers/fibers, 2 LLD, 2 xALT  
barrel:

192 AOH, 1152 channels

motivation for replacement

- almost no spares exist (bpix ~10, some of which need repair)
- current design prone to mechanical damage
- re-using existing AOHs for a new detector risky/not very practical
- other issues
  - radiation damage (increase of bias current/ power)
  - long pigtails not appropriate for new geometry
  - digital transmission?



## AOH radiation damage

Probably still functional  
after a few year of  $2E34$   
(assuming  $0.6E14 \text{ cm}^{-2} / \text{y} @ 1E34$ )

significantly increased currents

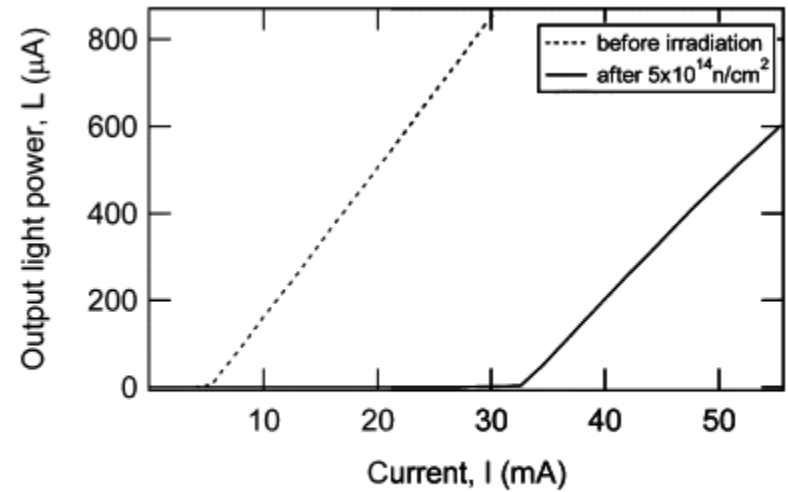
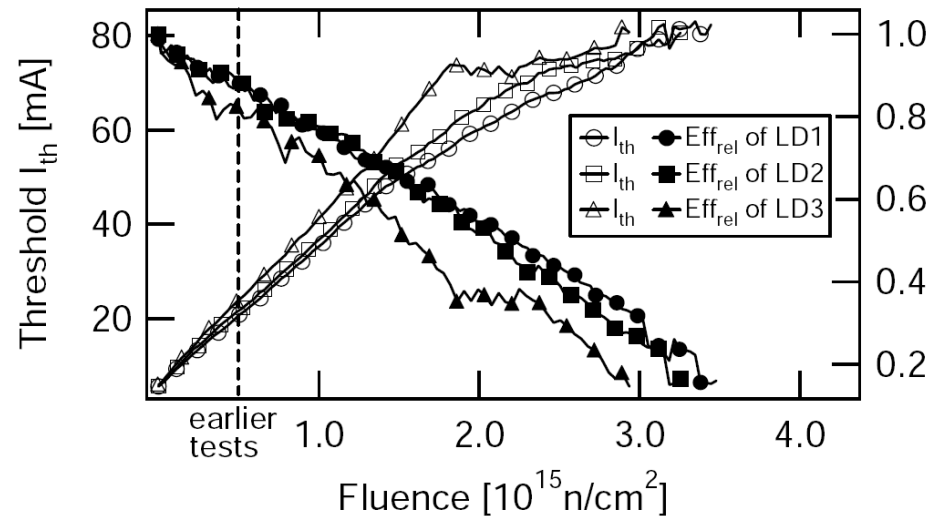


Fig. 5. Typical changes in laser L-I characteristic, threshold increase and efficiency loss, caused by neutron damage from a fluence of  $5 \times 10^{14} \text{ n/cm}^2$  ( $\sim 20 \text{ MeV}$ ) accumulated over 7 h at  $20 \text{ }^\circ\text{C}$ .

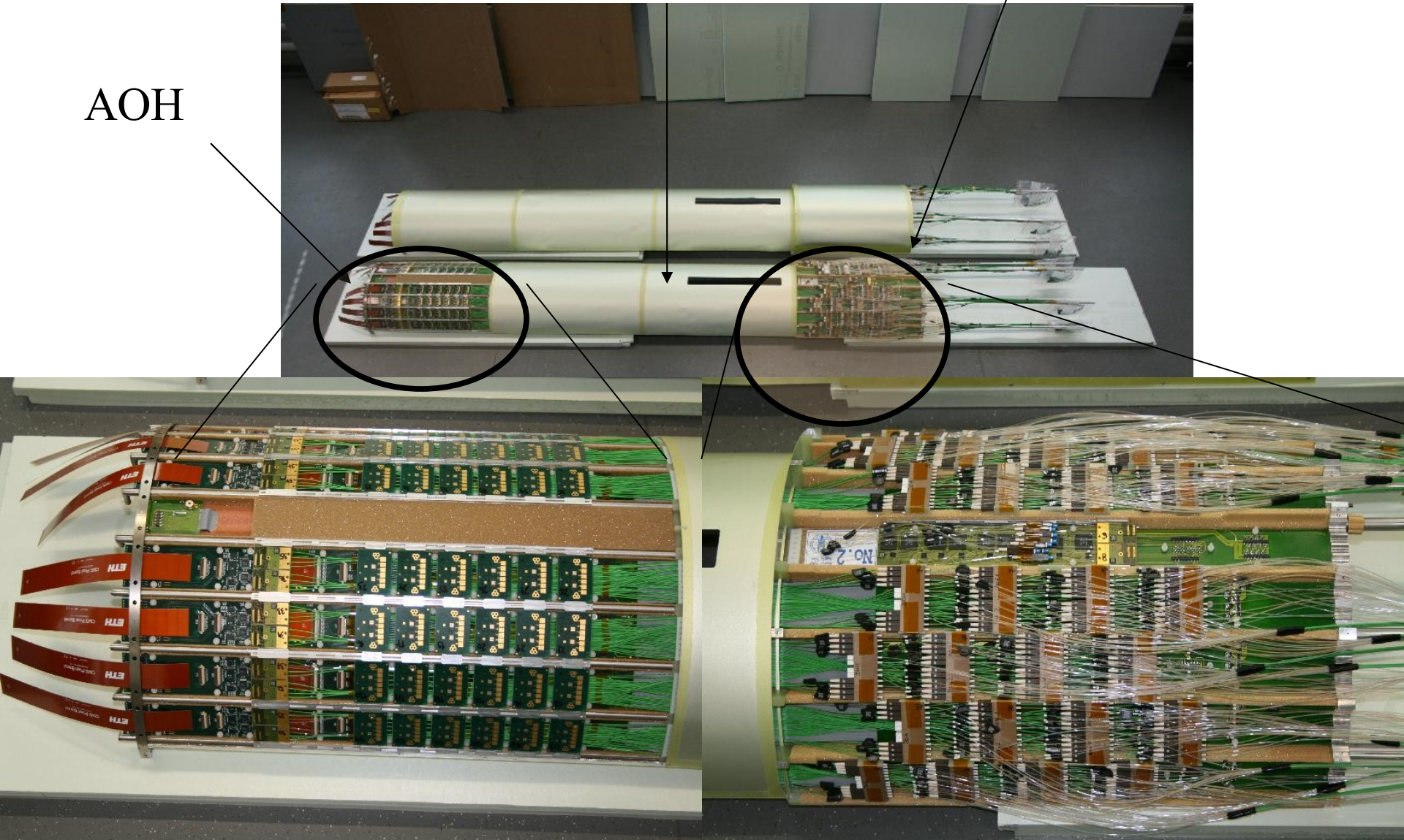


# Present pixel barrel supply tube with AOHs

Pigtails (+slack)

transition to ribbons

AOH



Shorter pigtails / splice connection preferred when AOHs move to higher z



# Replacement man-power estimate

Jobs to do:	Man month
•Buy laser chip wafer	1
• test set up for ALT chips	1
• test & select ALT chips	1
• evaluate company for fibre-laser-Si-plate assembly	2
• organize production of assemblies	2
• test laser driver chips LLD	2
• test irradiations of preseries of assemblies	2
• coordinate & redesing of new AOH PCB's	4
• CAD layout and fabrication of AOH PCB's	4
• fabricate & quality control of hybridized AOH boards	6
• final acceptance tests of AOH's & data base management	3
• repair (organize etc. ) of bad or broken AOH's	2
	30

Non-negligible effort