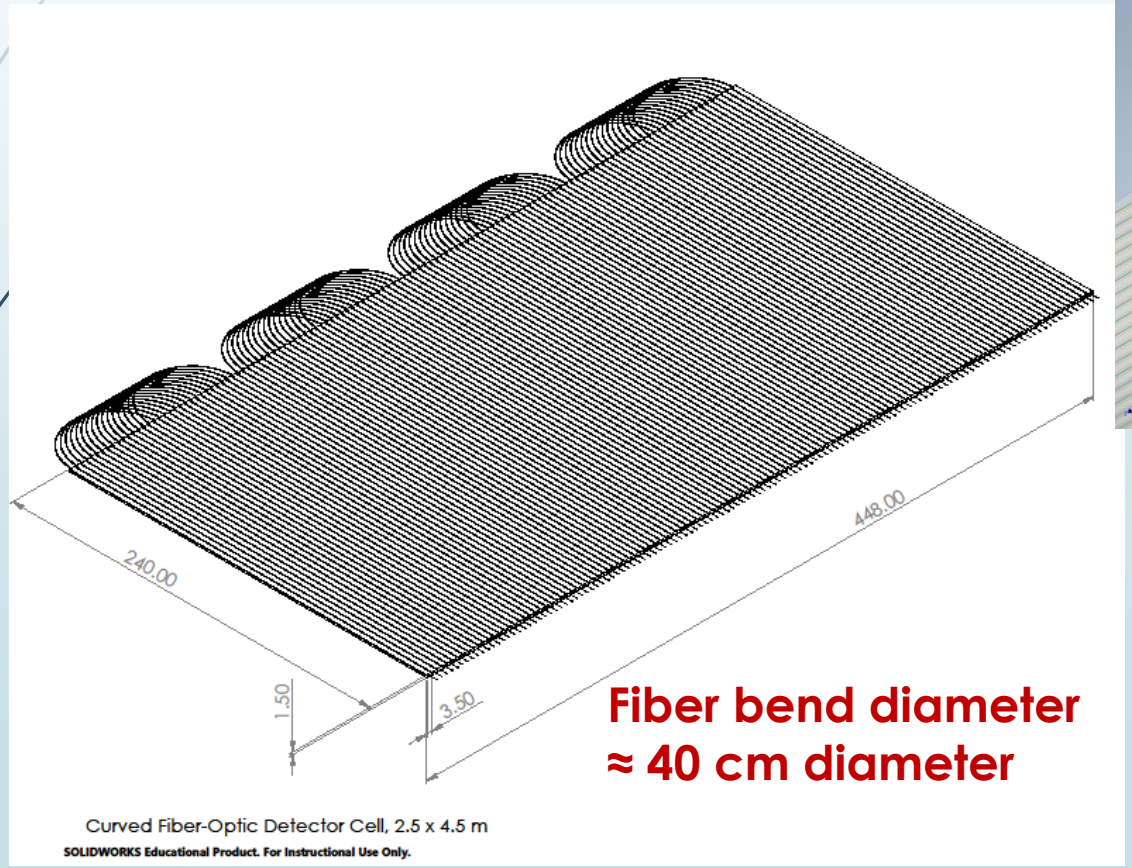
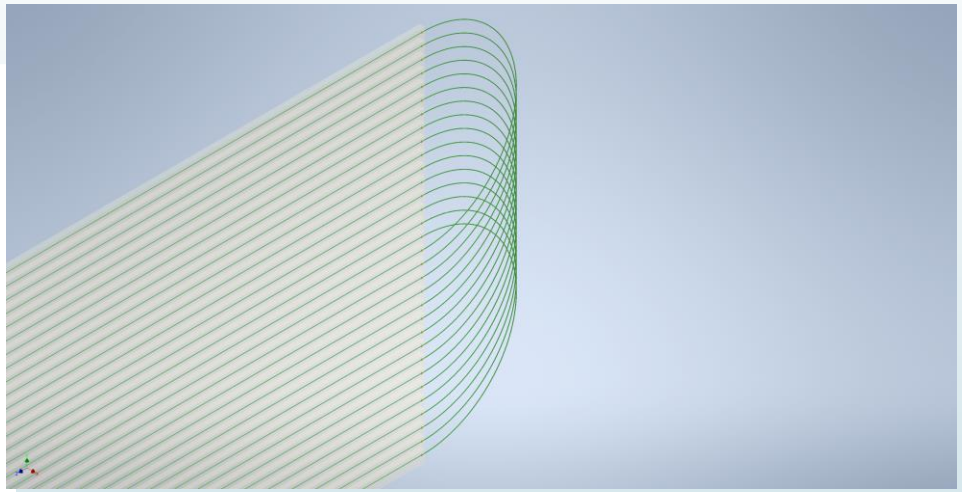
Detector plane layout studies

- Considering some possible layouts for scintillating detector planes – NB not a proposal
  - Layout option where all SiPM connections on one side of layer.
  - Leads to ≈ 2.4 m extruded bars.
- For this exercise consider scintillating bars that have width w = 3.5 cm, length L = 2.4 m and thickness t = 1.5 cm read out by 2 mm WLSF.
  - With 3.5 cm bar σ ≈ 1 cm for dimension transverse to the bar.
  - NB For 2 mm WLSF minimum bend radius is 200 mm (20 cm).
- Begin the exercise by looking at options that have number of bars that are multiples of 16 - may be convenient for DAQ.
- Thus 128 bars of dimensions noted above result in 2.4x4.48 m^2 units.
- Eight such units may allow for overlap and allow us to cover ≈ 9x9 m^2.
- Each unit weighs about 177 Kg and the 8 units that form one detector layer about 1.4 metric tons (using bar density of l.1 gm/cc).

Detector plane layout studies

- Left view of an assembled cell where readout is in units of 16 bars.
- Here fiber exiting first bar on left is inserted in bar 17, fiber from second bar in bar 18 …
- WLS fiber entering bar 1 & fiber exiting bar 17 used to determine longitudinal position…
- Right, view of the first 32 bars.





- Advantages
  - SiPMs one same side simplifies DAQ read out.
  - Cooling, insulation all in one unit on one side.
- Complications
  - Complicates assembly of WLS fiber and increases probability of fracturing of damaging fiber during installation.
  - Requires protective cover on WLS fibers

Detector plane layout studies

- More to Come – Stay Tuned