TKLAYOUT, A TOOL FOR CMS TRACKER DESIGN

Coffee seminar

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TkLayout

- ✓ CMS upgrade phase 2
- ✓ TkLayout is the tracker design tool
- ✓ material evaluation
- ✓ performance analysis

Phase 2

- ✓ outer tracker at advanced study phase
  - TB2S consolidate
  - TBPS still different options
    - ★ flat
    - ★ tilted
- ✓ pixel still open question
  - power?
  - laser?

TkLayoutfor phase 2

- ✓ monitor material budget
- ✓ design for pixel

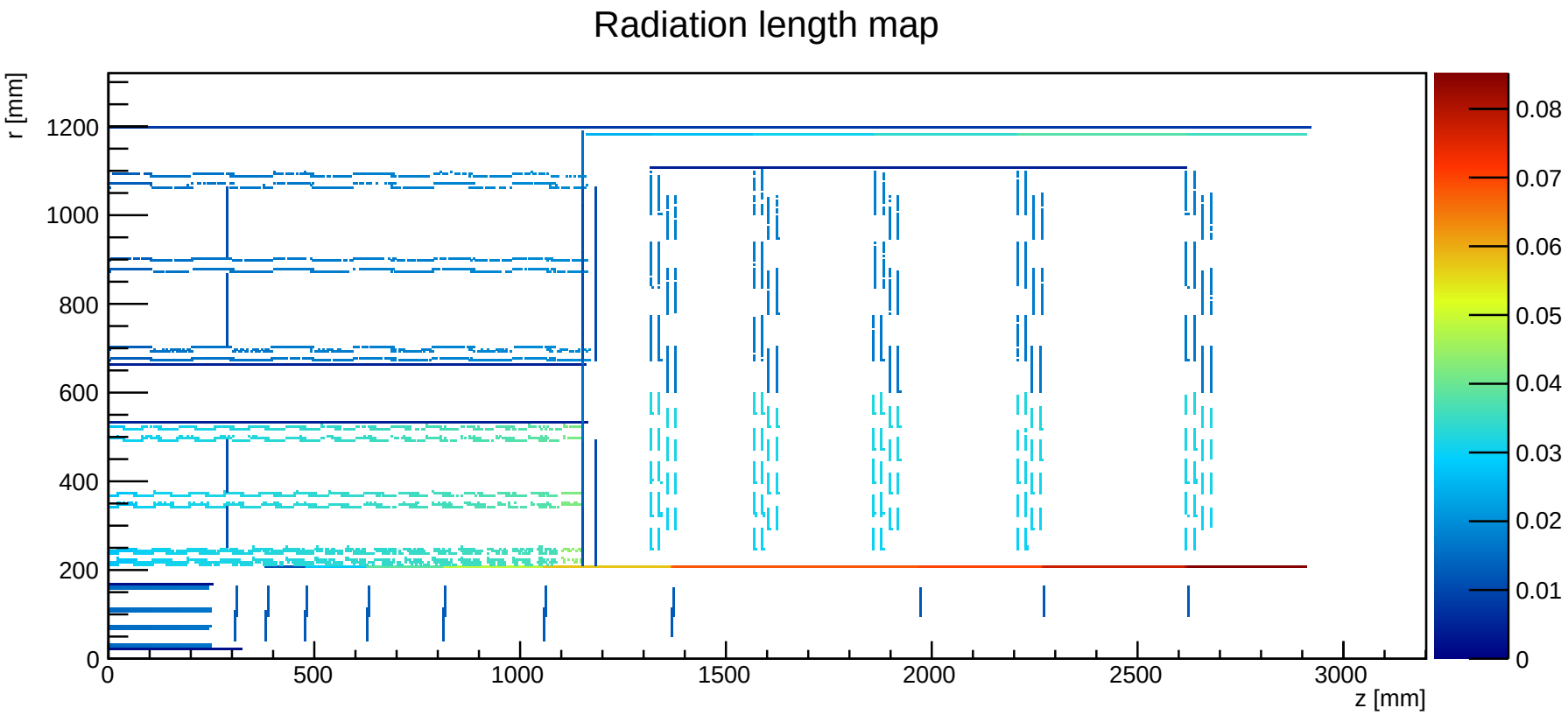
Main functionality

- ✓ predict material distribution and effects
- ✓ predict resolution
- ✓ generate modules definition for mechanical
- ✓ generate XML files for simulation

Work done

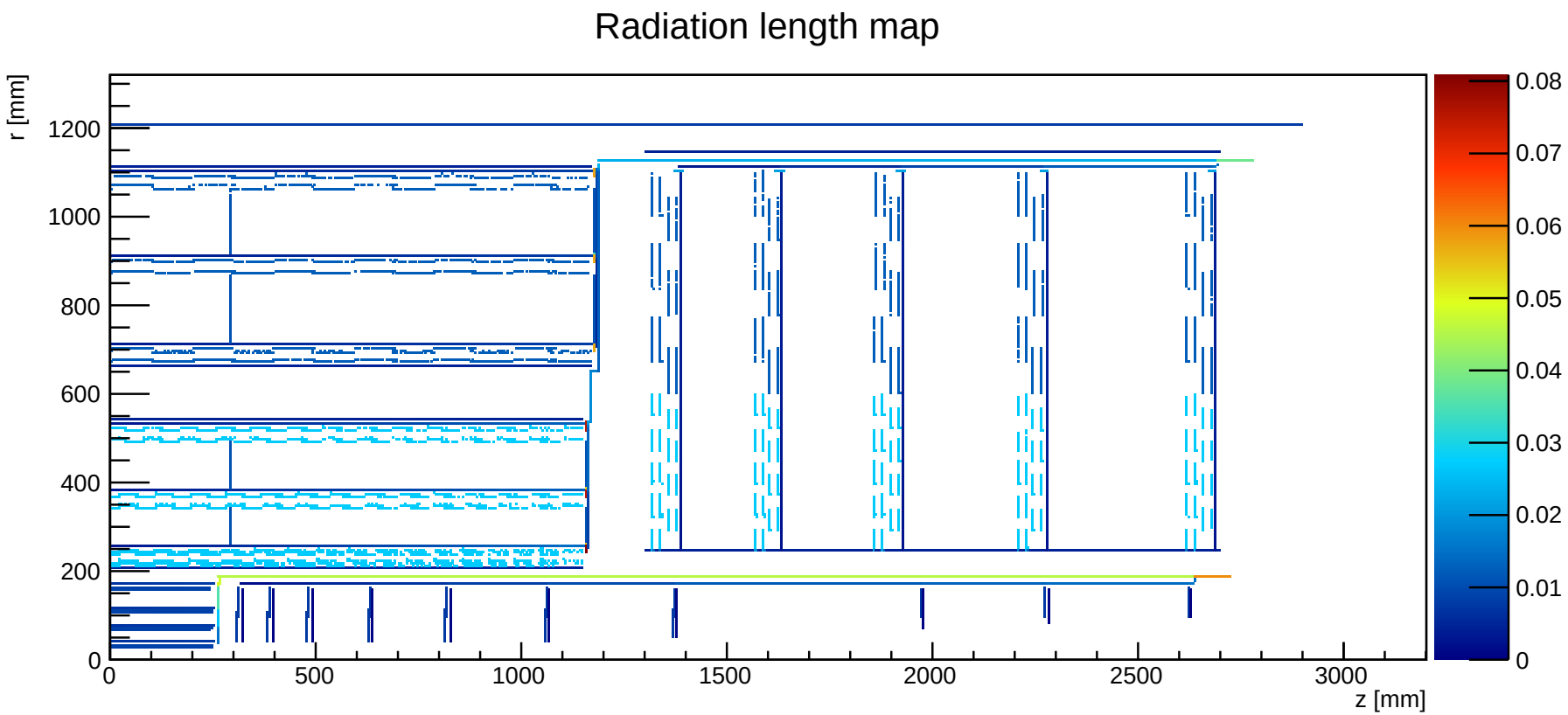
- ✓ radiation maps
  - multiple maps possible
  - more precision
- ✓ material model
  - configuration files definition
  - internal representation
  - routing algorithm
- ✓ small bugfix and improvements

Old material model



- ✓ Cables material distributed inside modules volumes
- ✓ Possible to model cooling pipe along rods, manifold in the flange and bigger cooling pipe out of the barrel

New material model

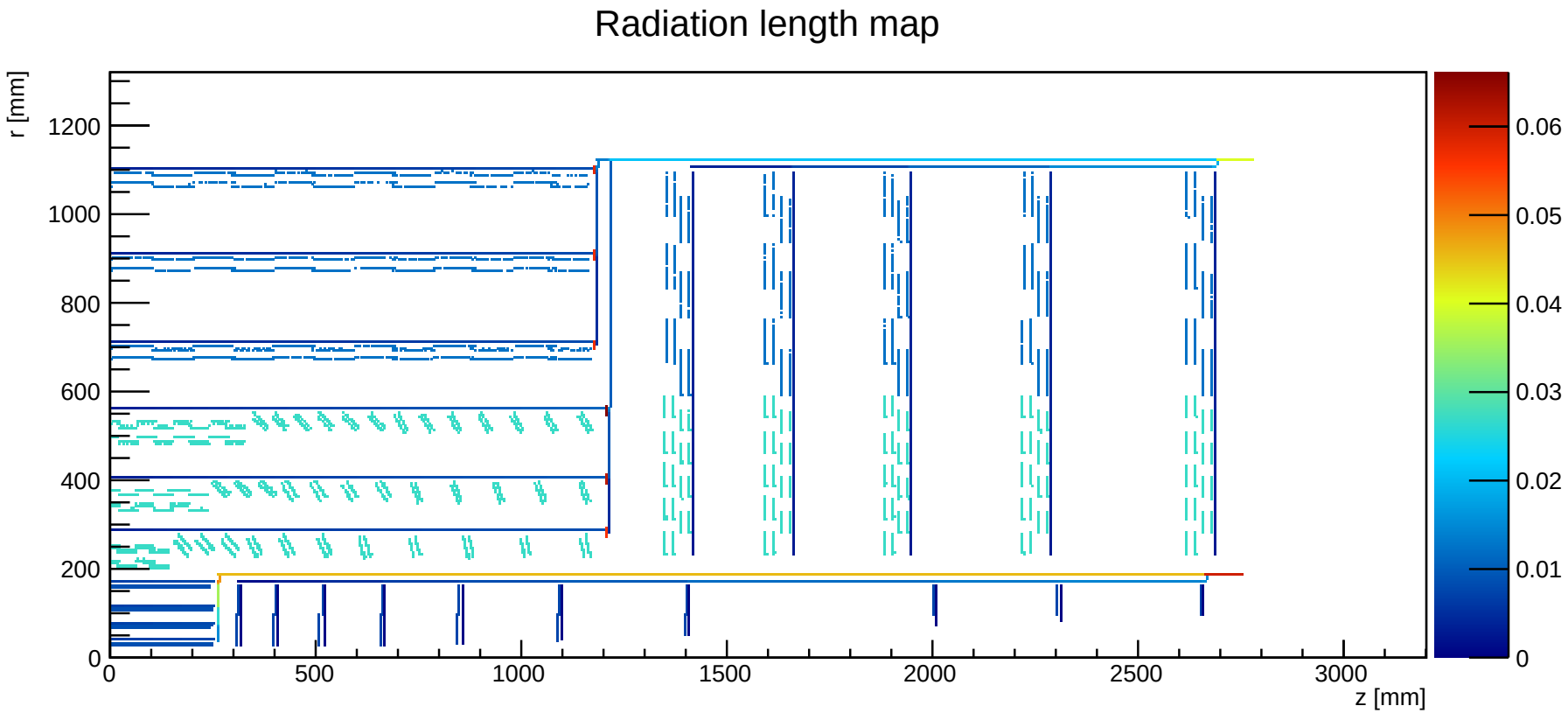


- ✓ Cables material in dedicated volumes
- ✓ More detailed
- ✓ Better routing algorithm
- ✓ More functionalities

Advantages

Correct description for tilted modules

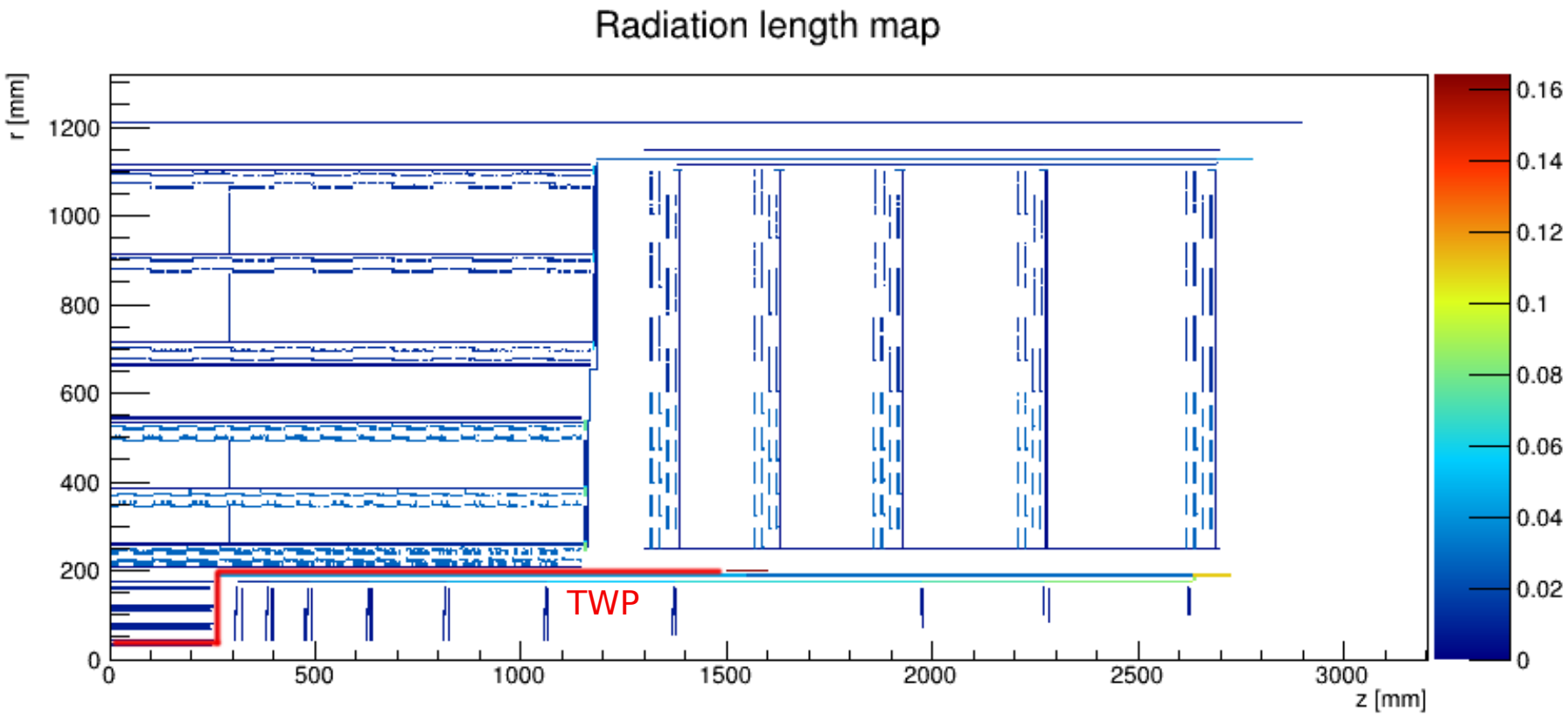
- ✓ In old model the cables were distributed over the modules
  - Not feasible in case of tilted modules
- ✓ Now is possible to model this design



New feature

Model for pixel-like materials

- ✓ For instance twisted pair from modules, electrical optical transducer, and optic fibers after it



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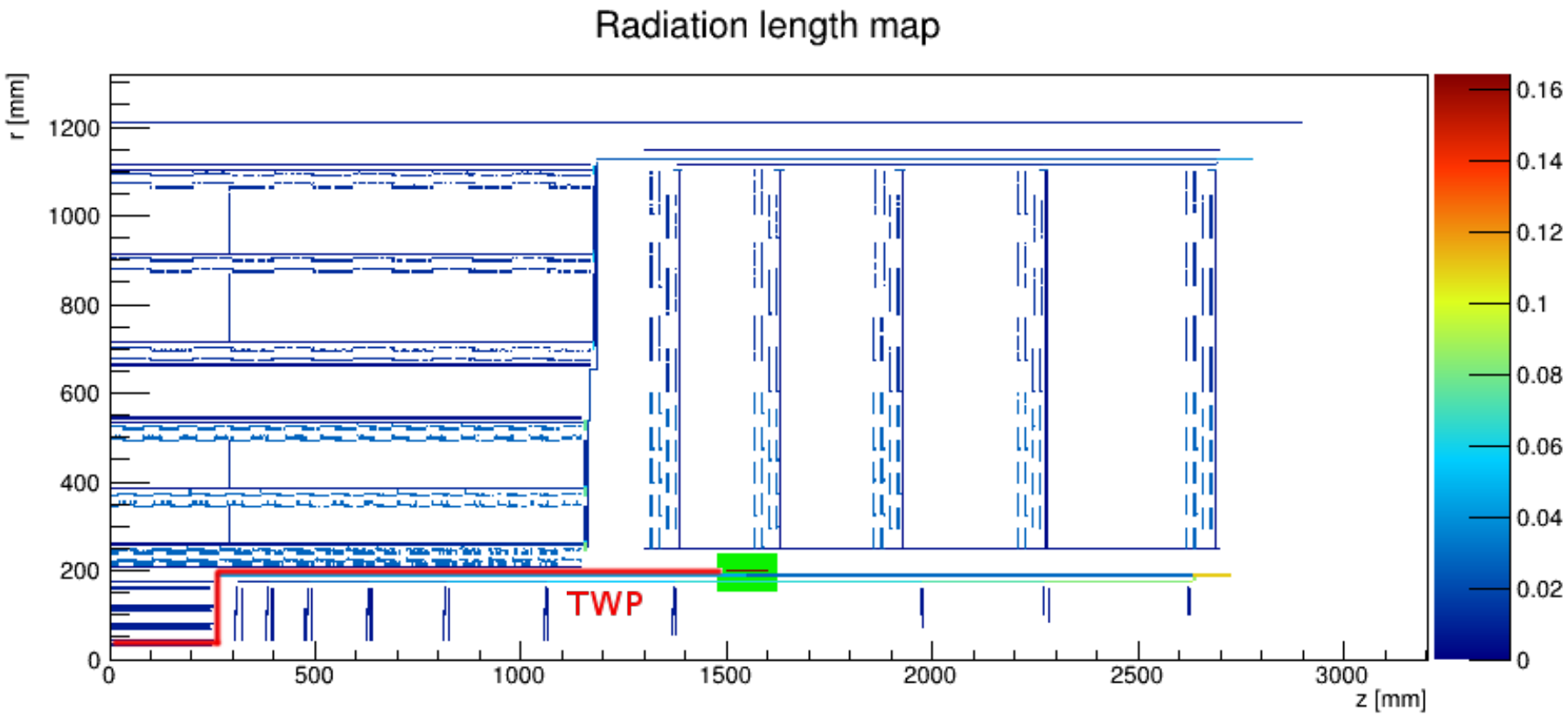

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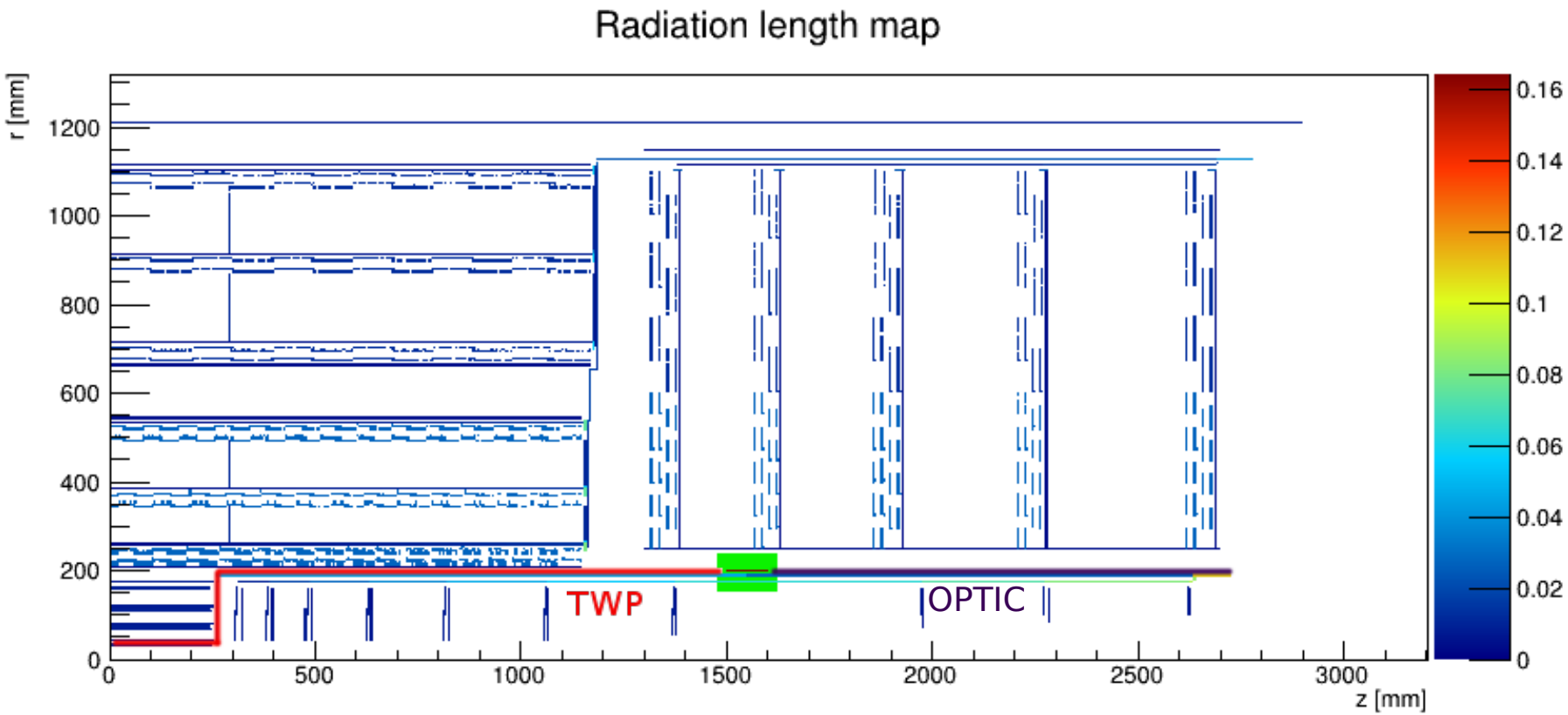

Advantages

- ✓ The new algorithm use the same underlying c++ objects of the old
- ✓ This means that the XML export is working as usual
  - only more detailed than before

Validation

1. Comparison between old and new models
2. Accurate tests new model only with controlled amount of material and exact computation of material amount