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WP 8.6 - HTS Cable

Open Steering Meeting

T. Winkler on behalf of WP 8.6

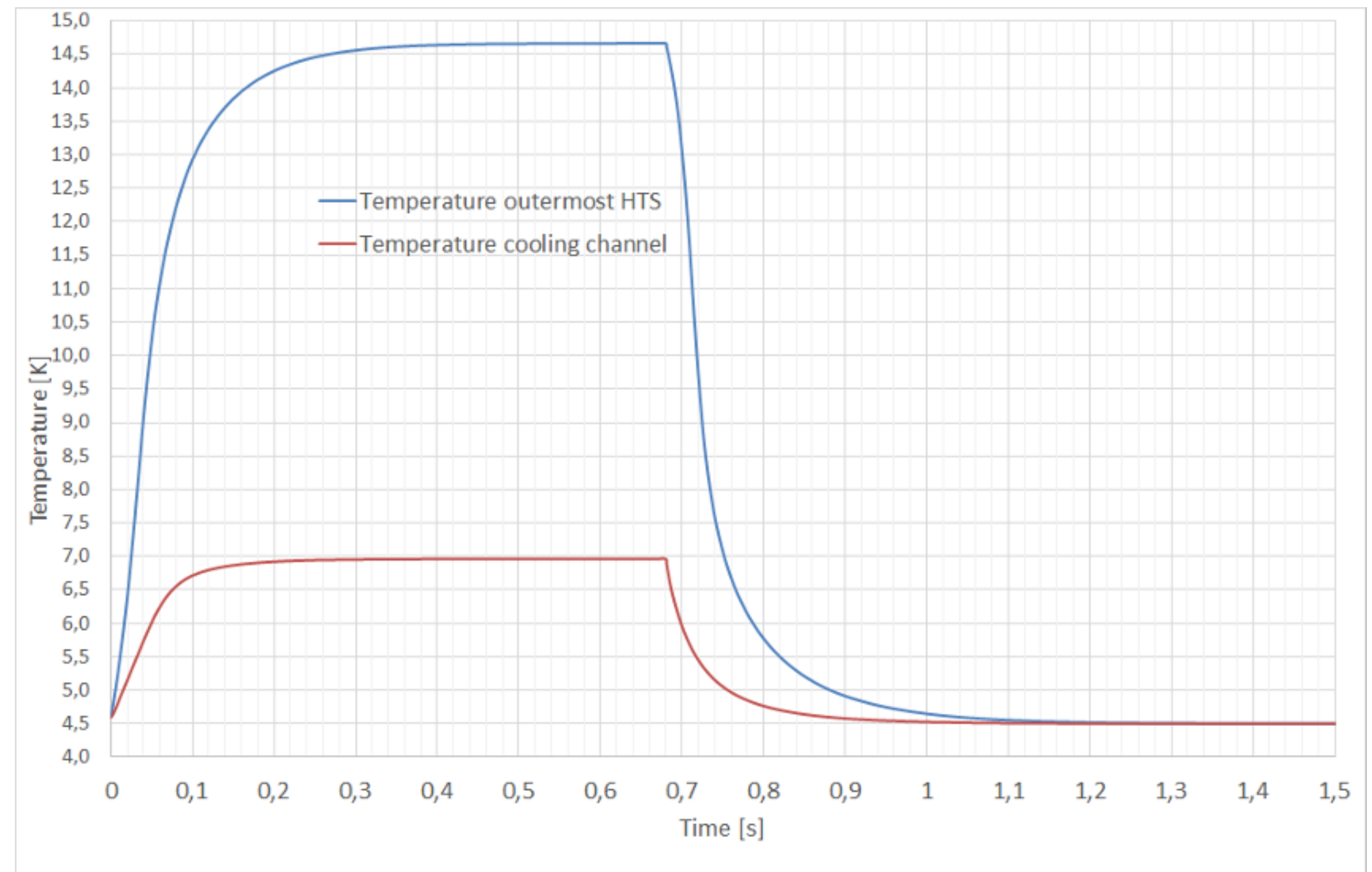
iFAST

AC loss

- Simplified formula for AC loss shows prohibitively high AC loss for commercial mm-scale HTS tape
- Countermeasures:
 - Reduce ramp rate from 1 sec to 10 sec
 - Tape striation: 4 mm => 0.5 mm
 - Allow for temperature swings of cable of > 10 K
- AC loss reduction from 373 W/m to 4.6 W/m (-98 %)

Temperature stabilisation

- Simulation with 27 W/m
- Stable temperature within 0,7 sec
- For 10 layer cable with 0.15 W/m*K between layers



New steps

- Refine cable definition (layers, amount of tapes, length)
- Refine thermal simulations with
 - Thermal boundary resistance from coolant to cooling tube
 - Find working points for cable length and radial thermal contact
- Confirm assumptions about AC loss reduction for striated tapes (make samples and measure them at 77 K and 4.2 K)