



EXPERIMENTAL DETERMINATION OF CONVECTIVE HEAT FLUX TO A PMMA SURFACE

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RSE@Q SD>e?coA >Dt@N Cent?eTFo?CcQDnNCLent?DA RSE@QTRSE@QTV e?A anP

Ex>e?@ entaBCtDG@C oWtQe?A aB>DA e\XaB@te?act@n @ CA aBCCAe coA >a?A ent W? FDS FaB@at@n

Ex>e?@ entaBCetD>E

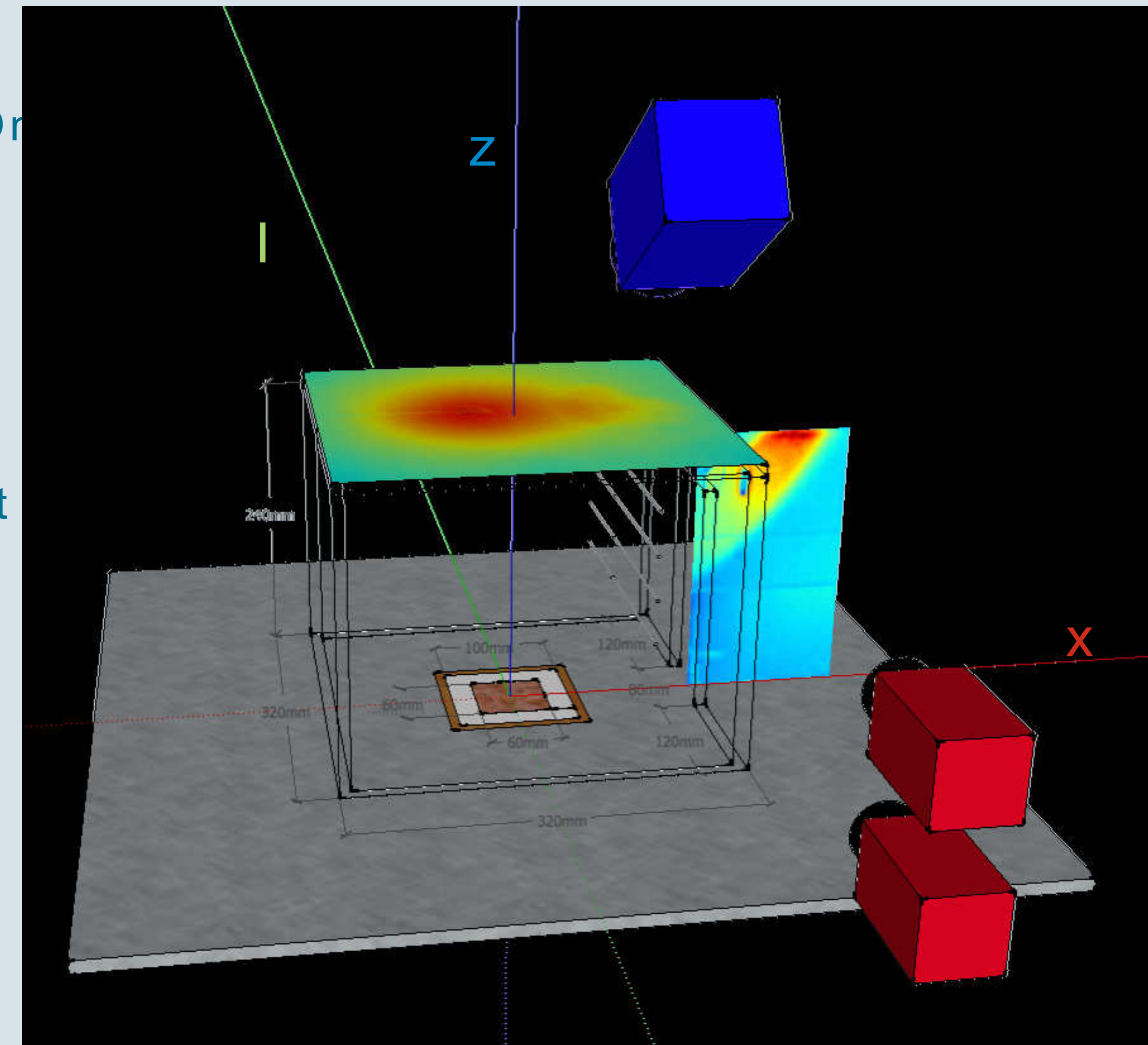
- Plexiglas (PMMA) compartment (D.EF m x D.EF m x D.FGm) with a door opening (D.DHm x D.FDR)
- Heat source is an electrical operated copper block

P?eF@DC @tDG@CE

- Jignificant deKiation in the flow rates through the doorwal between experimental data (Particle Image VelocimetrI NPLM) and solution of OPJ model @S
- Plausibilit check of the experimental data was done bl means of an independent measurement techniTue (Uaser Poppler VelocimetrI NUPM) @S
- Possible causesV
 - Wbundarl conditions - heat transfer through the PMMAheating source
 - Modelling errors

CD??ent @tDG@CE

- Petermination of the wall temperatures of the compartmentNespecialll of the ceiling
- Xxamination of the flow field through the doorwal

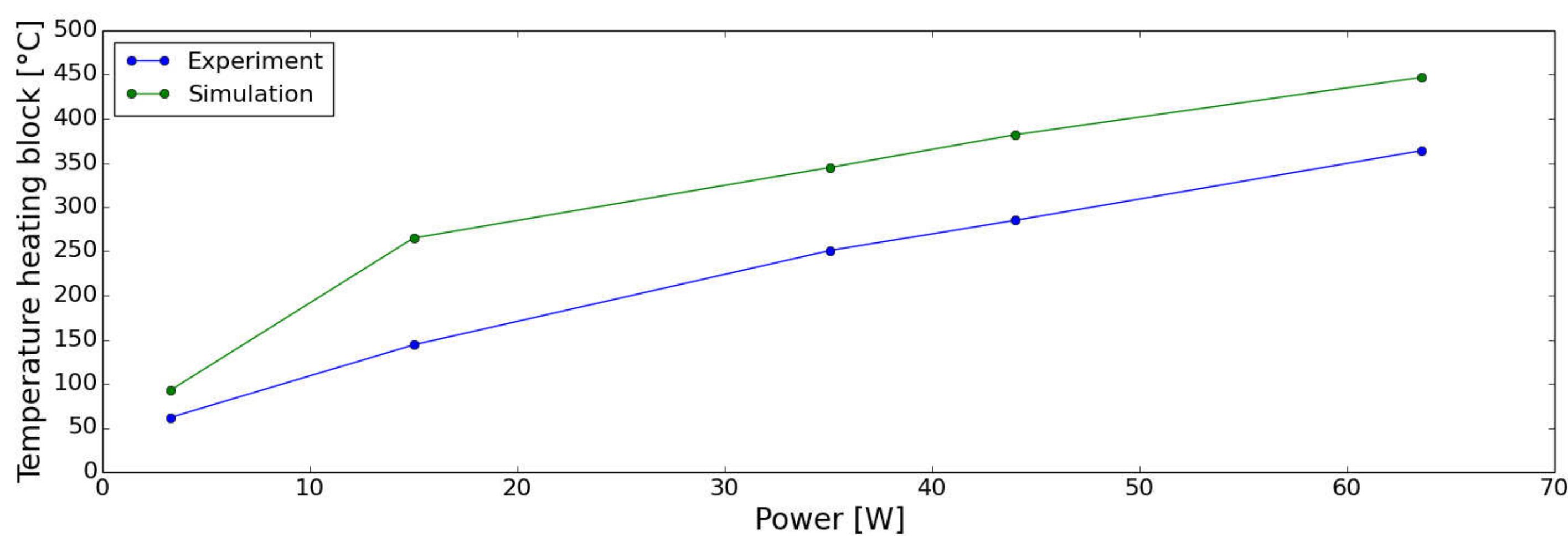


MeaCD?eA ent

- Jurface temperatures are measured bl a thermal imaging camera and thermocouples
- Pifferent power leKels of the heating block are inKestigated
- Zhe flow field through the doorwal is measured bl a PIM-sI stem

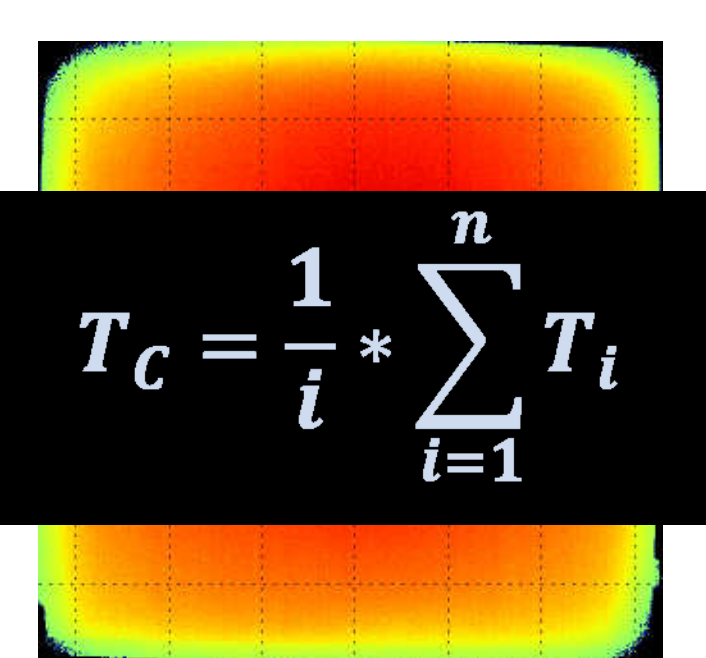
Ex>e?@ entC anGS@ DBat@nC

- Heat@N bBcOteA >e?atD?eCA eaCD?eG bP a tQe?A ocoD>B



- ! Zhe heating block temperatures in the simulations are higher than in the experiments Z_{HWexp} , Z_{HWsim}
- ! InKestigation of the influence of the PMMA on the heating block with respect to reflection and absorption of the radiation (transmissionaD)
- ! Petailed inKestigation of the heat loss of the heating block

- AFe?aNcG ce@N teA >e?atD?e @teN?ateG ofe?tQe CD?Aice

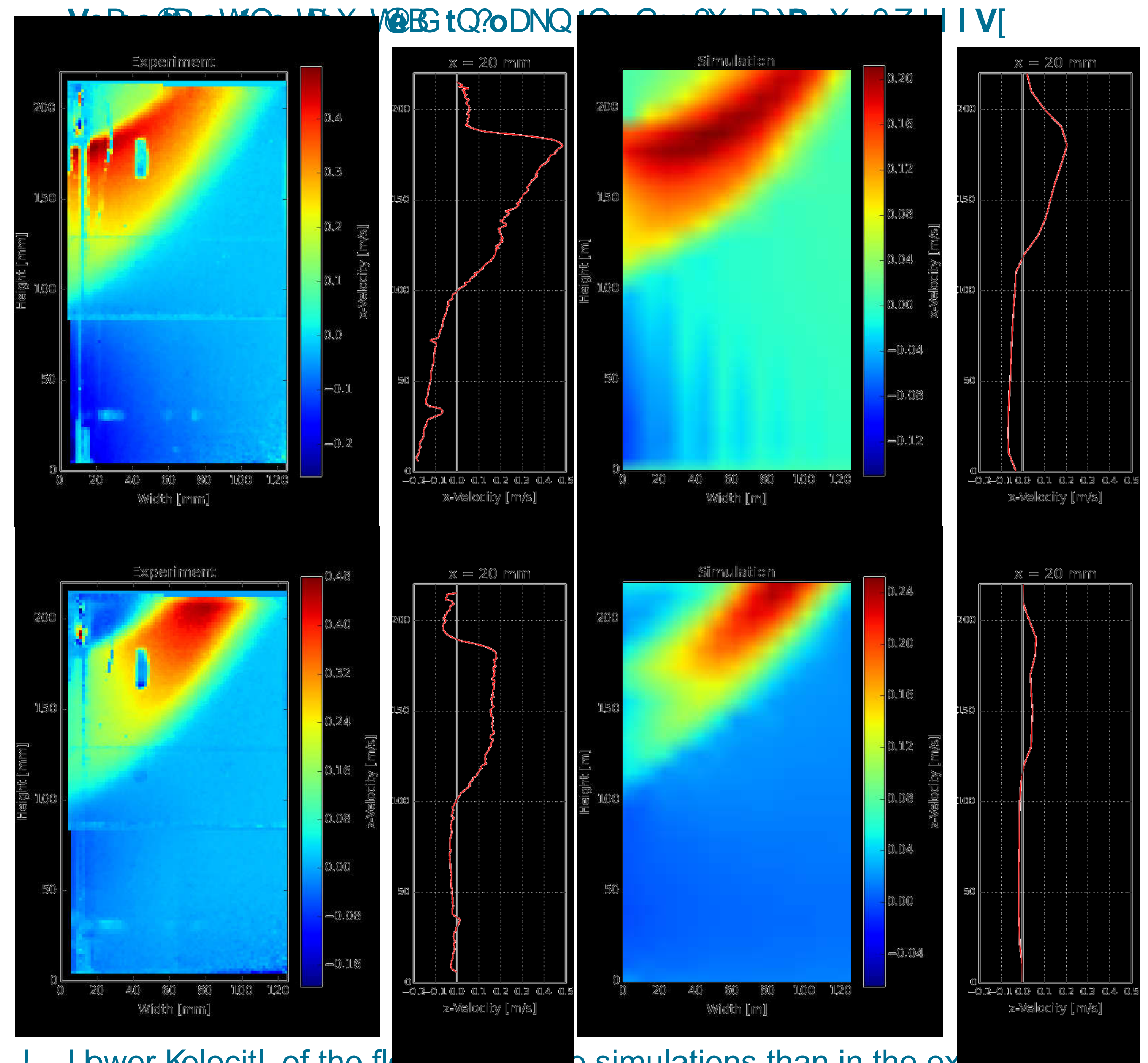


$$T_c = \frac{1}{i} * \sum_{i=1}^n T_i$$

	H VoB	Jl VoB	Kl VoB	Ll l VoB	LM VoB
Yeiling Temperature Xperiment Z_{Yexp} QYS	F\ .RD	FJ \.R]	FH^_	ED.^_	EE.] R
Yeiling Temperature Jimulation Z_{Ysim} QYS	FD.F	FD.\	FD_	FD.^	FR.F

- ! Zhe heat transfer through the Plexiglas in the simulations are much lower than in the experiments Z_{HWexp} , Z_{HWsim} , Z_{Yexp} , Z_{Ysim}
- ! Yheck the modelling

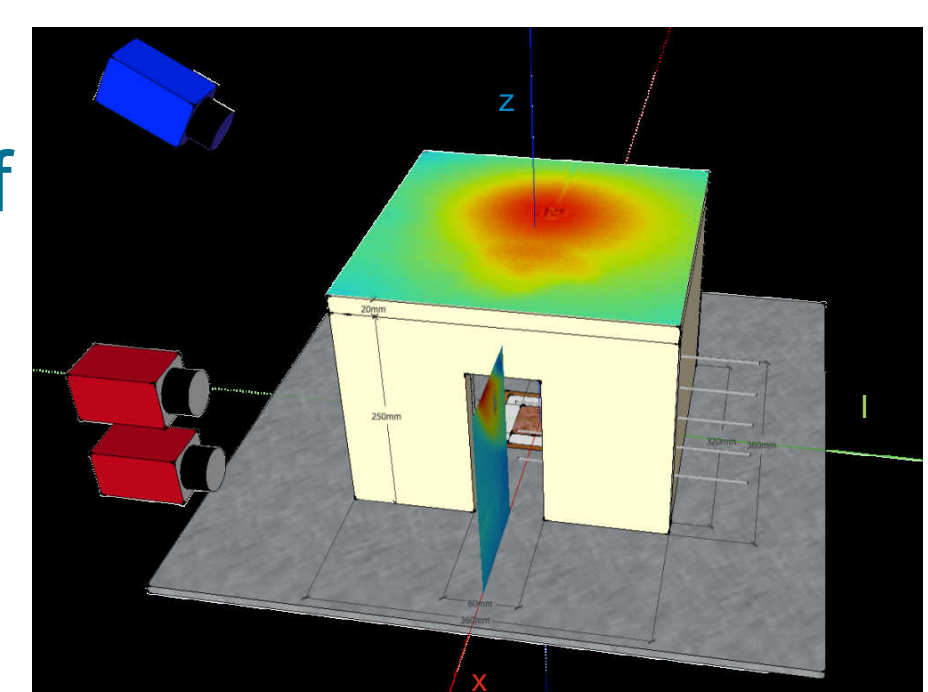
Y.F. @D WQ VEX V@B tQ?oDNQ @C @X DIB X 0711 IV



- ! Lower Kelocitl of the flow field in the simulations than in the experiments

Next Ste>C

- Ourther improKement of the boundarl conditions of the experiments and the simulations e.g. bl isolating the enclosure walls
- InKestigation of the heat loss of the heating block and improKement of its modelling



ReVe?enceC

- @S MeundersNA.NA studl on buol ancl -driKen flowsVc sing particle image KelocimetrI for Kalidating the Ore PI namics JimulatorNAJ Jeries Mblume ER
- @S WeltNA.NZtemperature and laser Poppler KelocimetrI measurements of a spill plume in a small scale experiment with an electrical heat source