

Verschleiß-Vorhersage-Simulations-Modell

Predictive Wear Simulation Model

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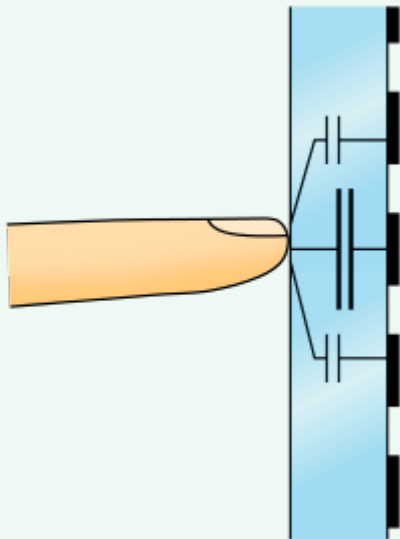


Acknowledgements

Thanks to the state of Hawaii for the hospitality and all the ALOHA!
Well, of course, and thanks also for the nice project!

ENDLESSLY TOUCHABLE

Doing this



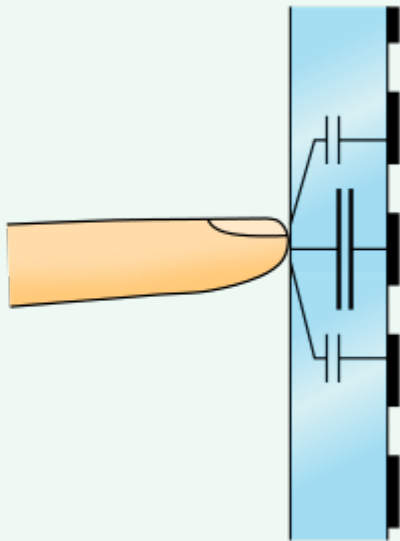
Avoiding this



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THE NEXT GENERATION OF MATERIAL OPTIMIZATION

Doing this



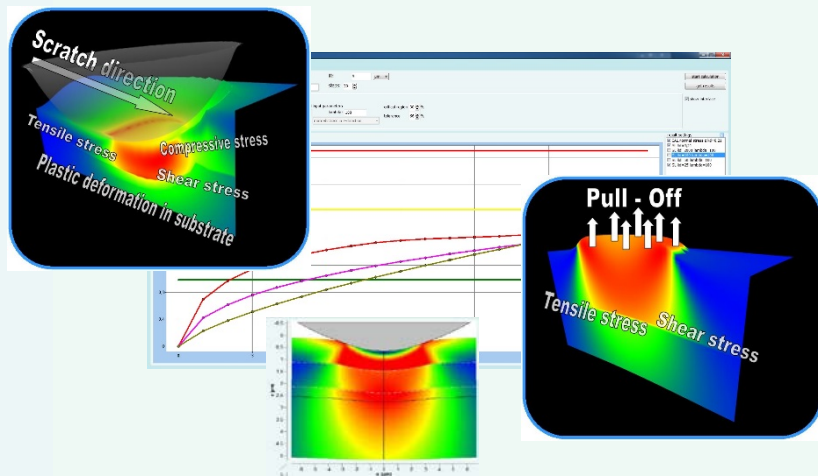
Avoiding this



→ Complex Coating Structures and Material Combinations

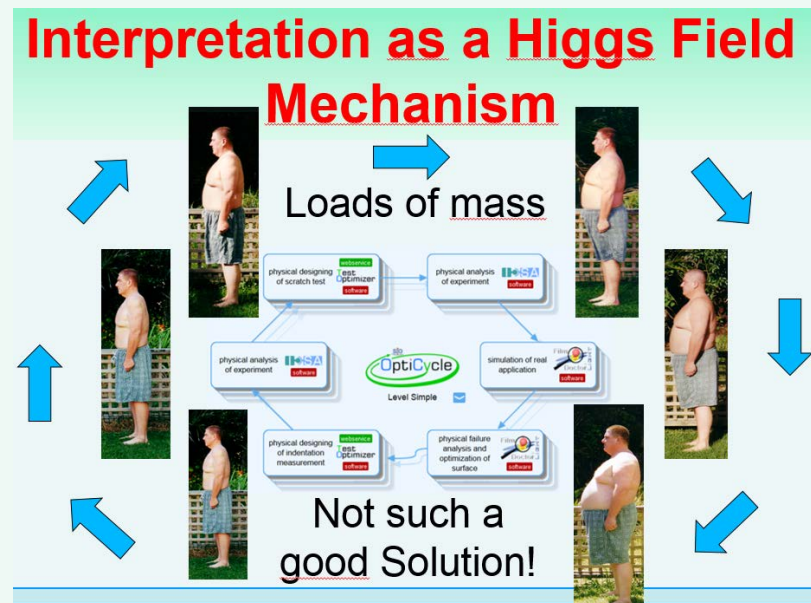
THE “FUNNY” STRUCTURE OF THIS TALK

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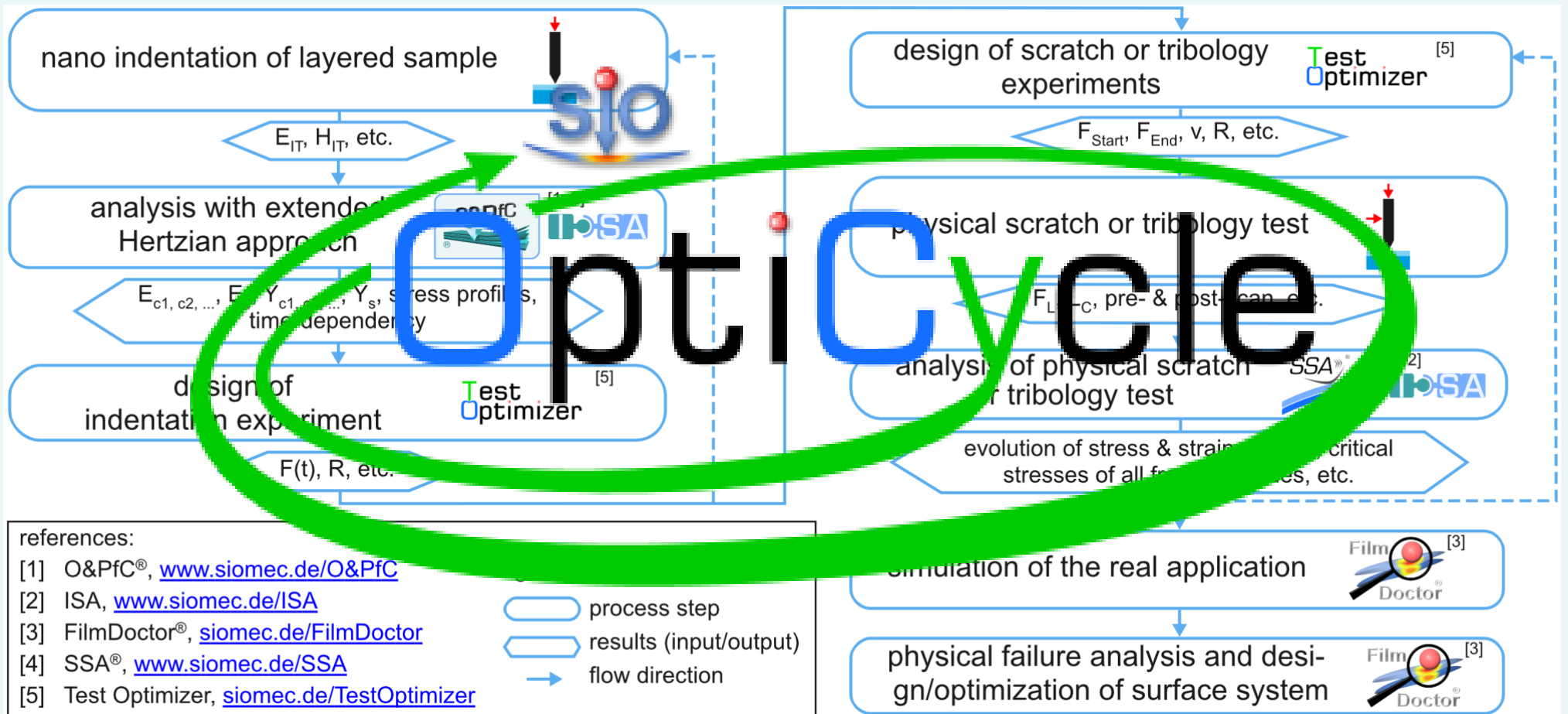
**➔ Sorry Managers
and Accountants!**

**Market/Management
Holistic Optimization &
Socio-Economic
Simulations**



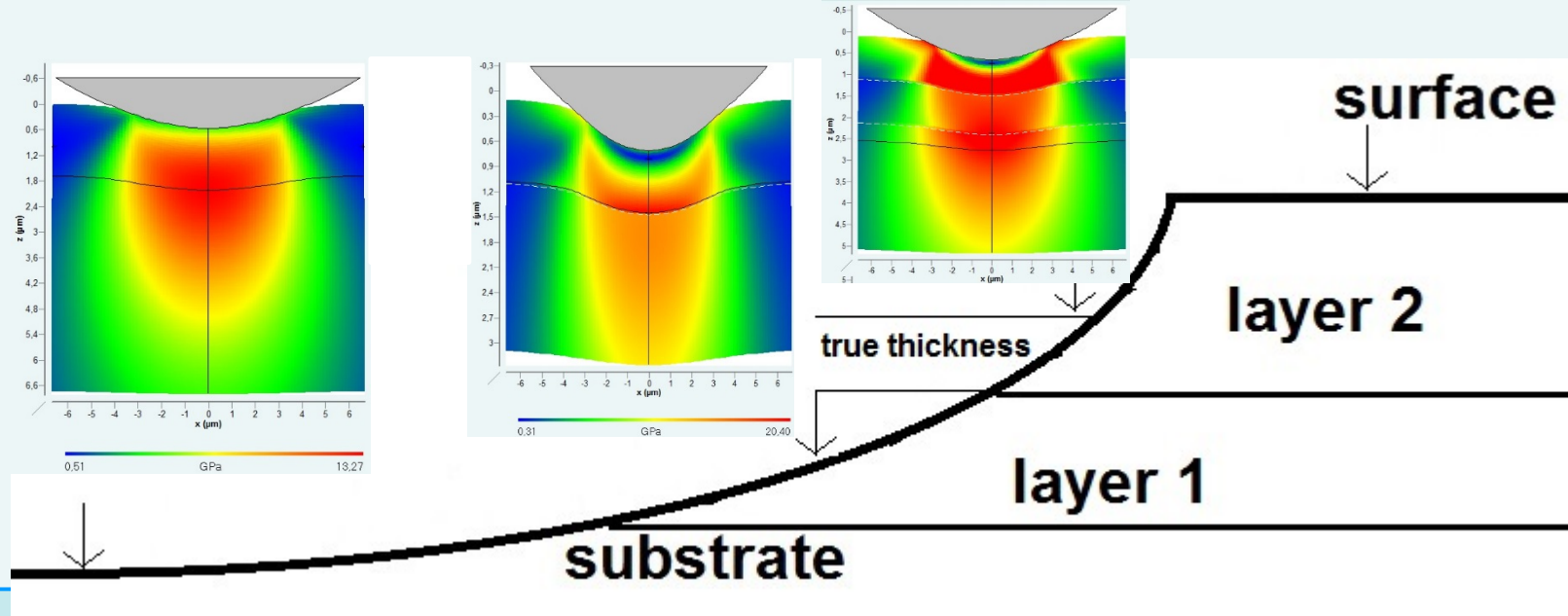
➔ Sorry Engineers!

The flow chart of the Plan

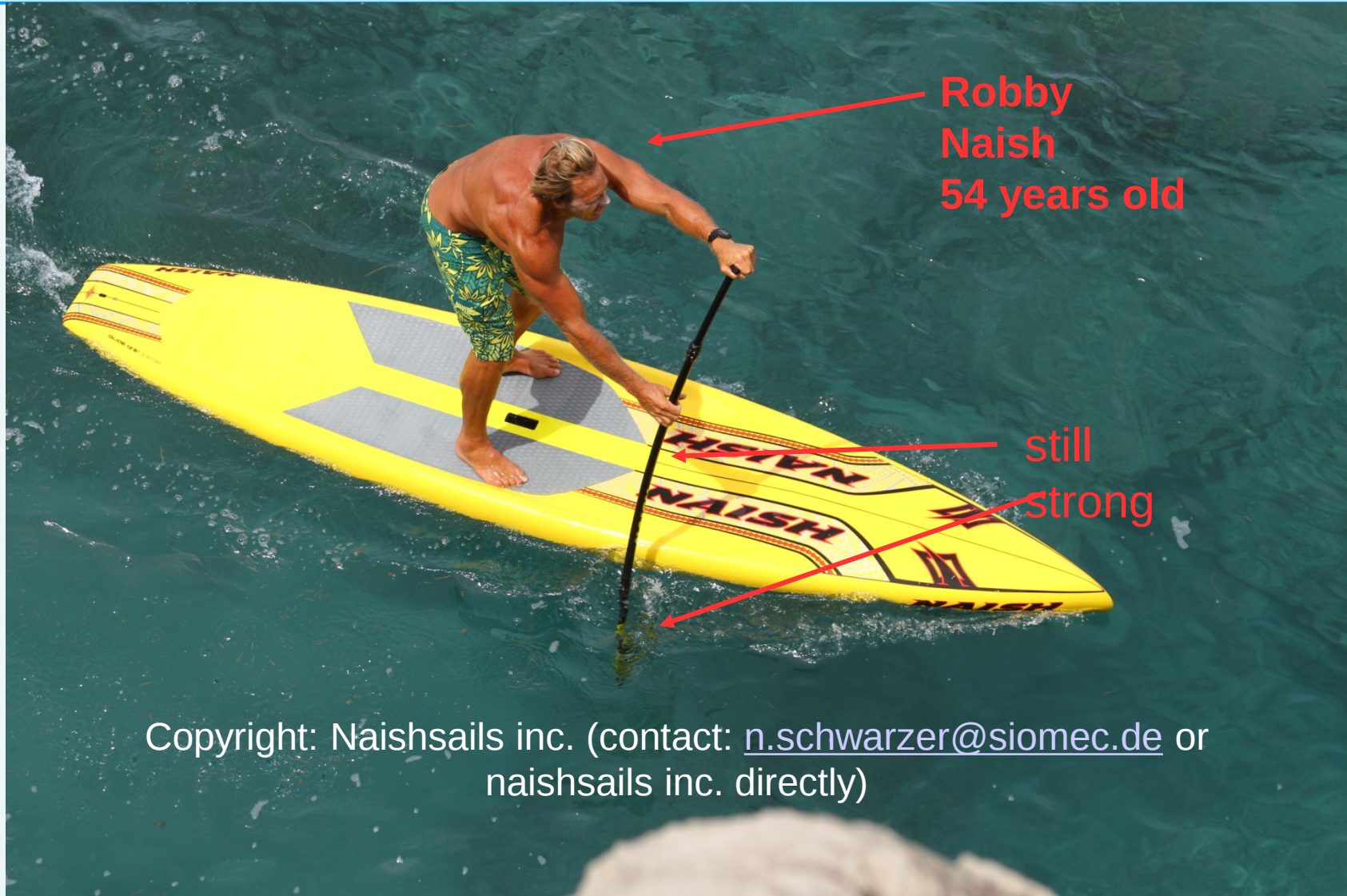


How it works in detail

- Analysis III: 1 μm thick layer 2 $\rightarrow E_{21}$
- Analysis IV: 3 μm thick layer 2 $\rightarrow E_{22}$
- If E_{21} and E_{22} differs significantly check homogeneity!

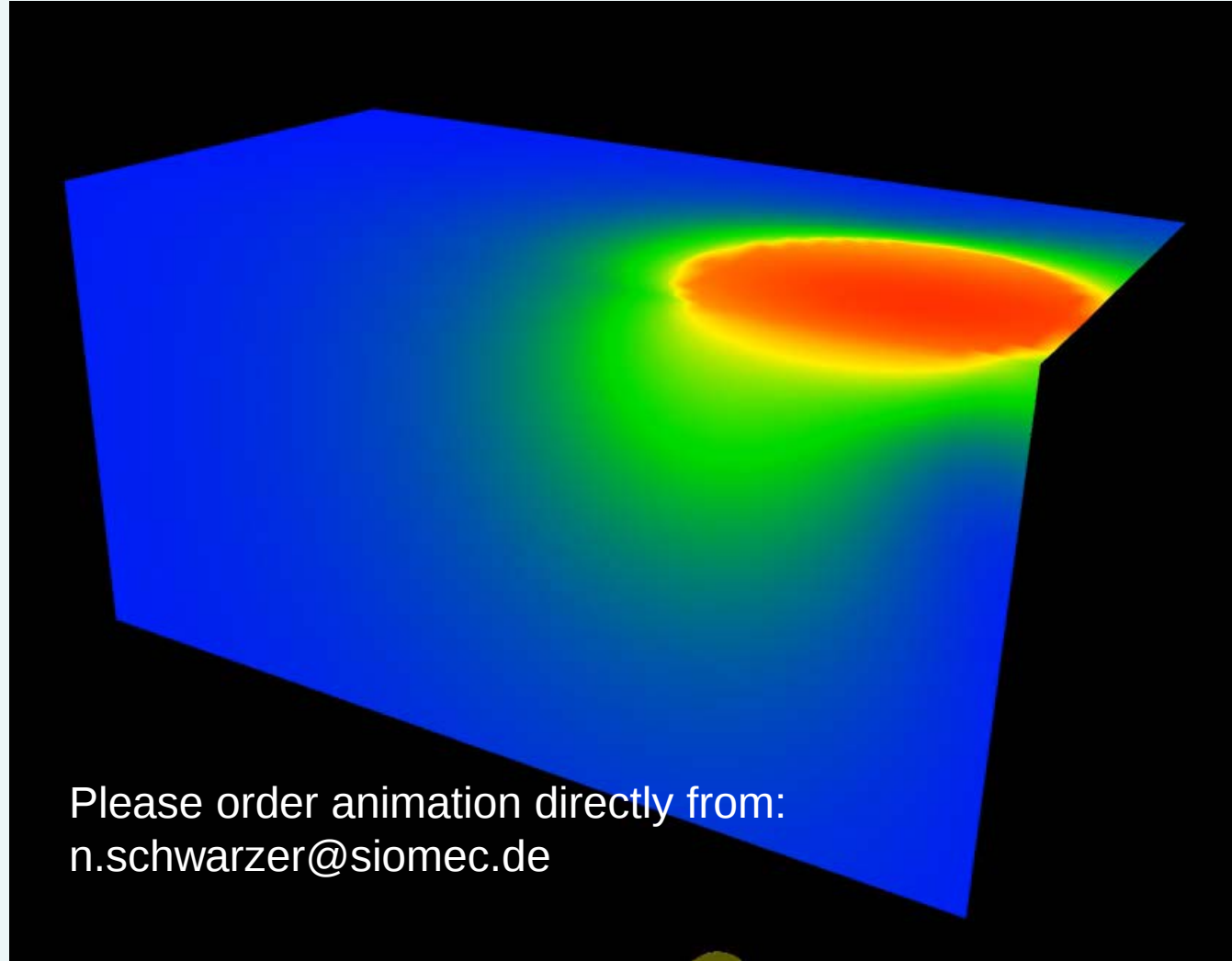


Example: SUP-Paddle joints – project work for Naishsails inc. Maui, USA



Copyright: Naishsails inc. (contact: n.schwarzer@siomec.de or naishsails inc. directly)

The wider OptiCycle



Here one more general approach

$$\text{tribo-effect}_{ij} = \hat{k}_{ijkl}^{\sigma} \sigma^{kl} + \hat{k}_{ijkl}^{\varepsilon} \varepsilon^{kl} + \hat{k}_{ijkl}^u u^k u^l + \sum_{n=1}^N \hat{k}^{S_n} \delta_{ij} S_n$$

By simplification ($\rightarrow$ Proceedings of ICMCTF)

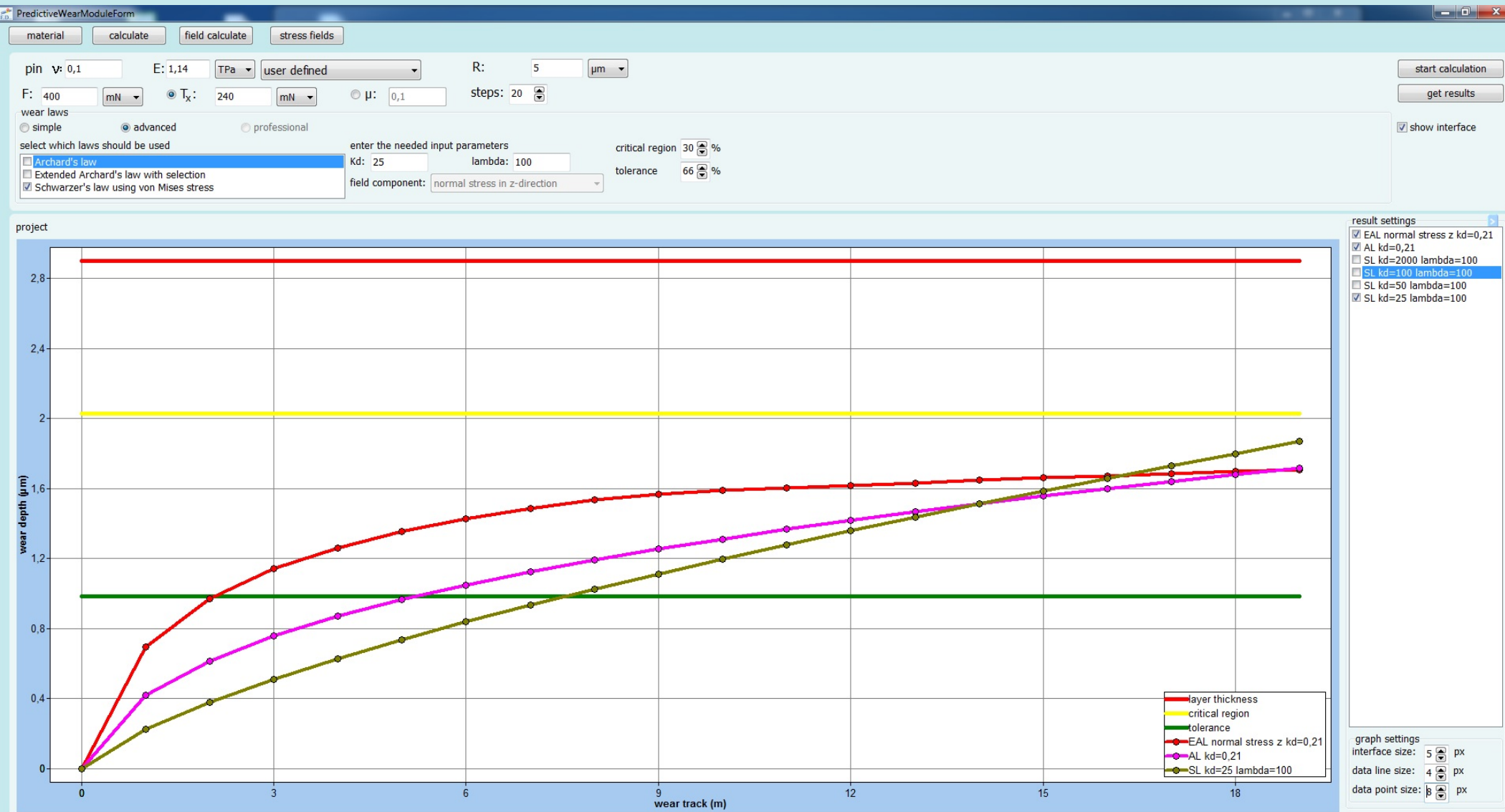
$$\text{tribo-effect}_{ij} \equiv w_{ij} = \hat{k}_{ijkl} \sigma^{kl} \equiv \delta_{ij} \left(k_{dM} \sigma_M \cdot e^{-\lambda_k \vec{r} \cdot \vec{r}} \right)$$

Or Archard's law

$$h_w = w_{ij} n^i n^j = k_{ijkl} \sigma^{kl} n^i n^j = k_{33kl} \sigma^{kl} \simeq k_{3333} \sigma^{33} \equiv k_d \sigma^{33}$$

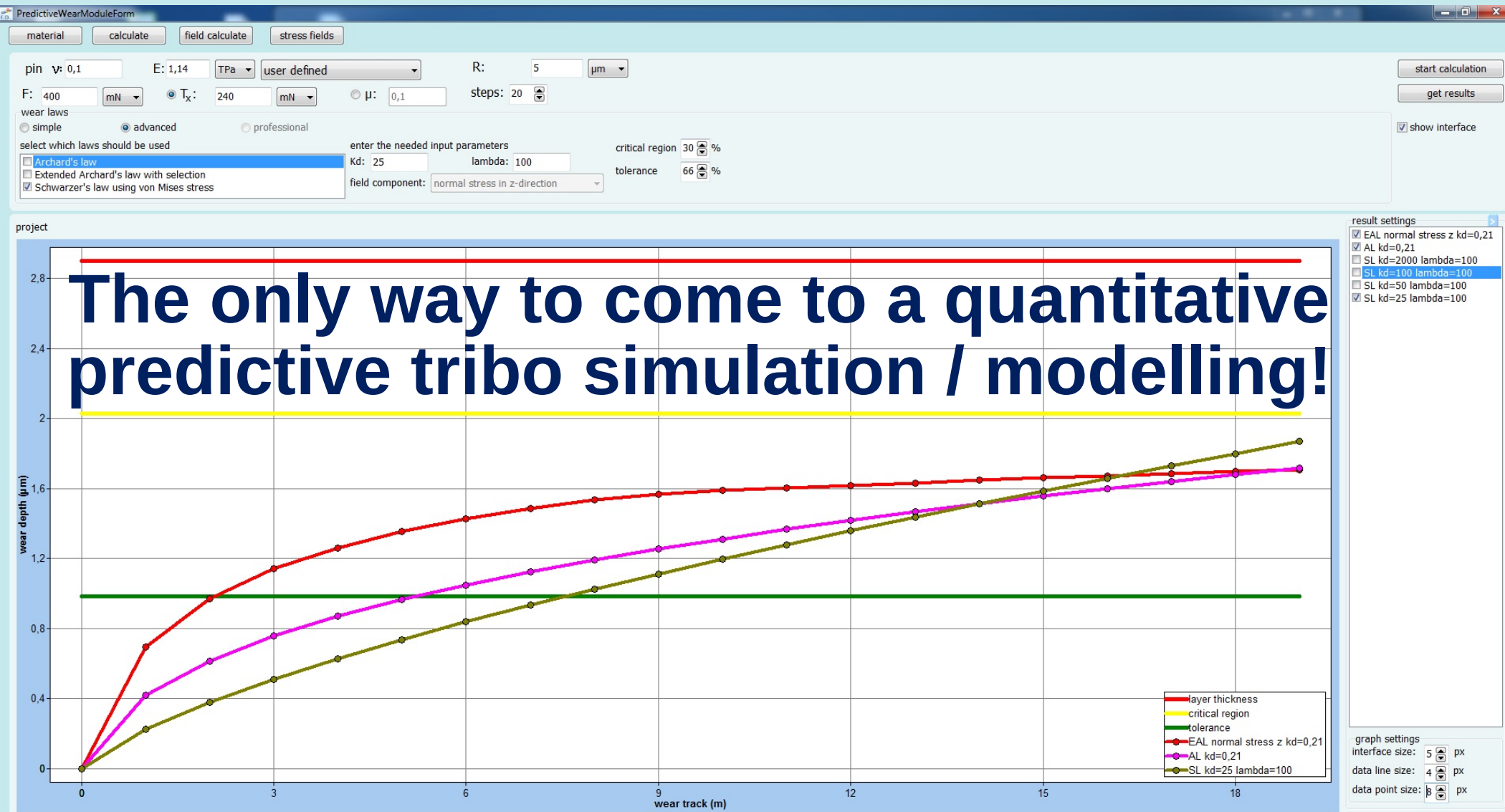


Talking about tribo- or wear laws





Talking about tribo- or wear laws



Talking about tribo- or wear laws

Here one

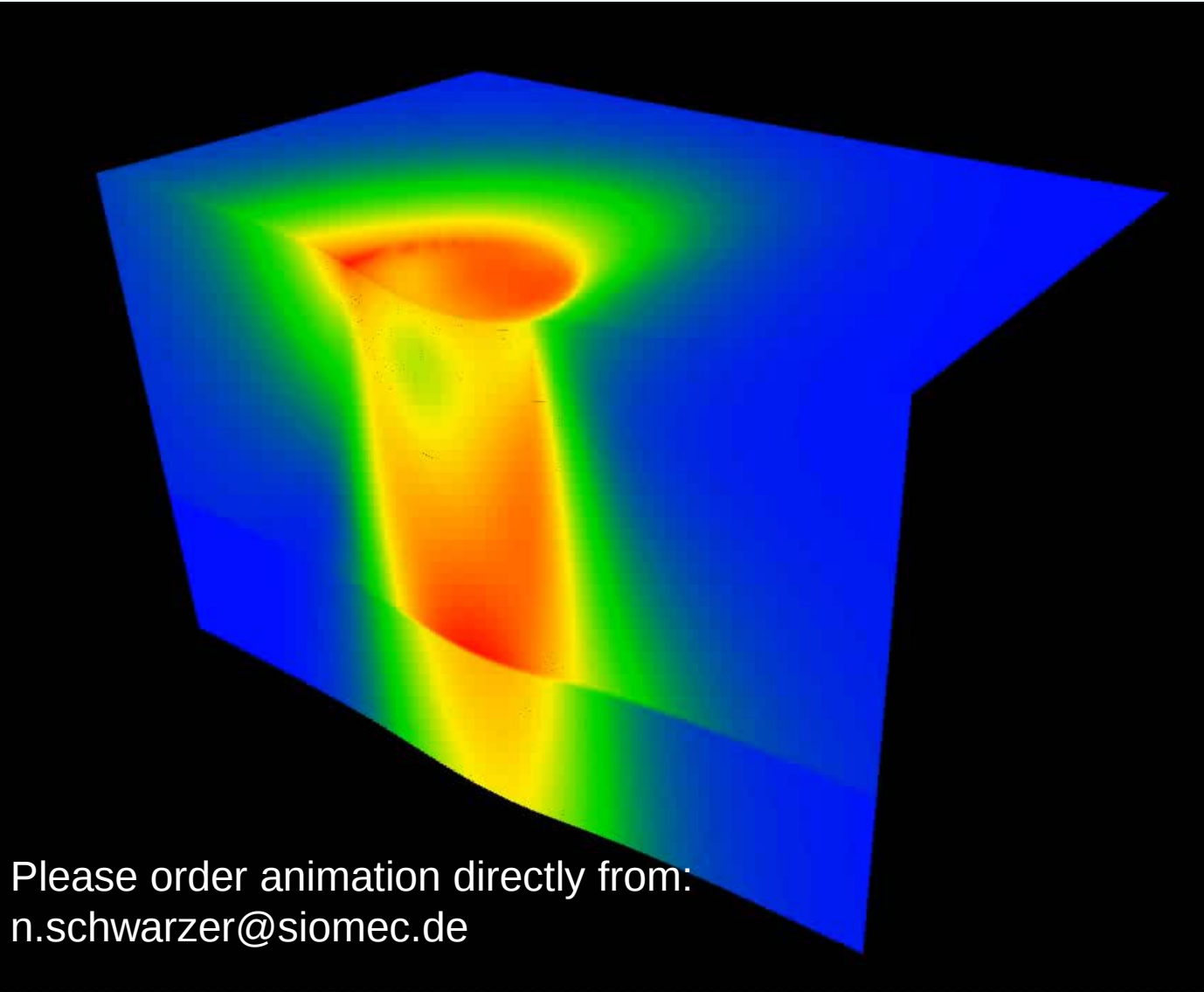
tribo-eff

By simp

tribo-

Or Arch

$$h_w = w_{ij}$$

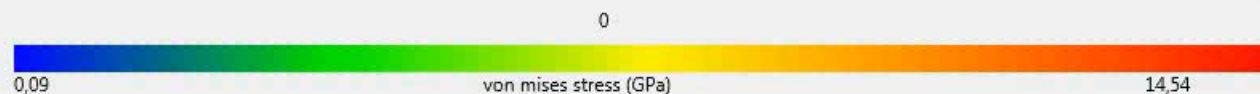


Please order animation directly from:
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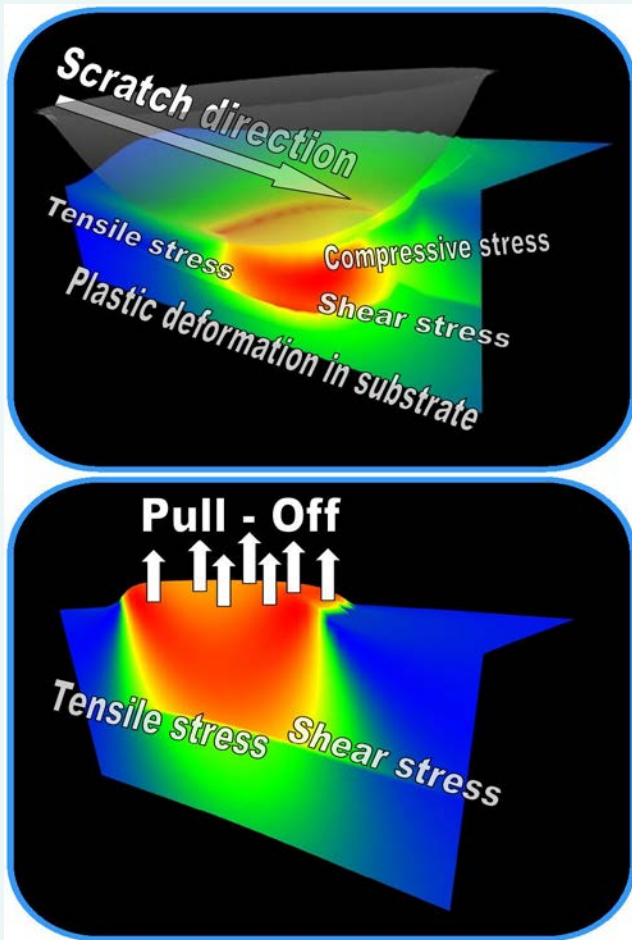
$$\hat{k}^{S_n} \delta_{ij} S_n$$

$$\text{CTF}) \cdot e^{-\lambda_k \vec{r} \cdot \vec{r}})$$

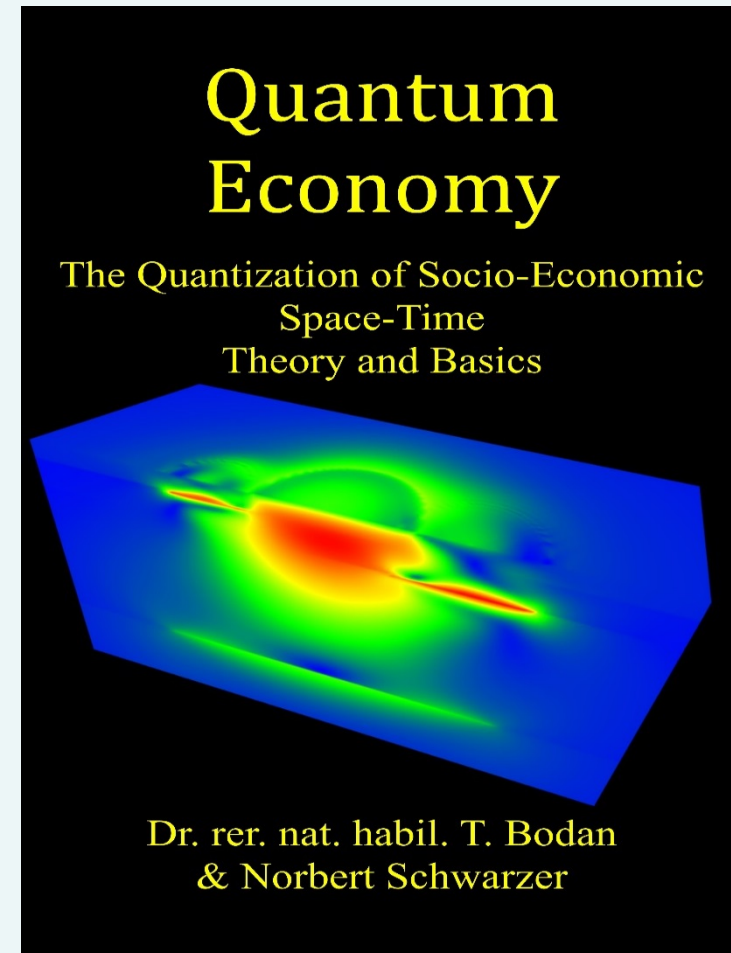
$$\equiv k_d \sigma^{33}$$



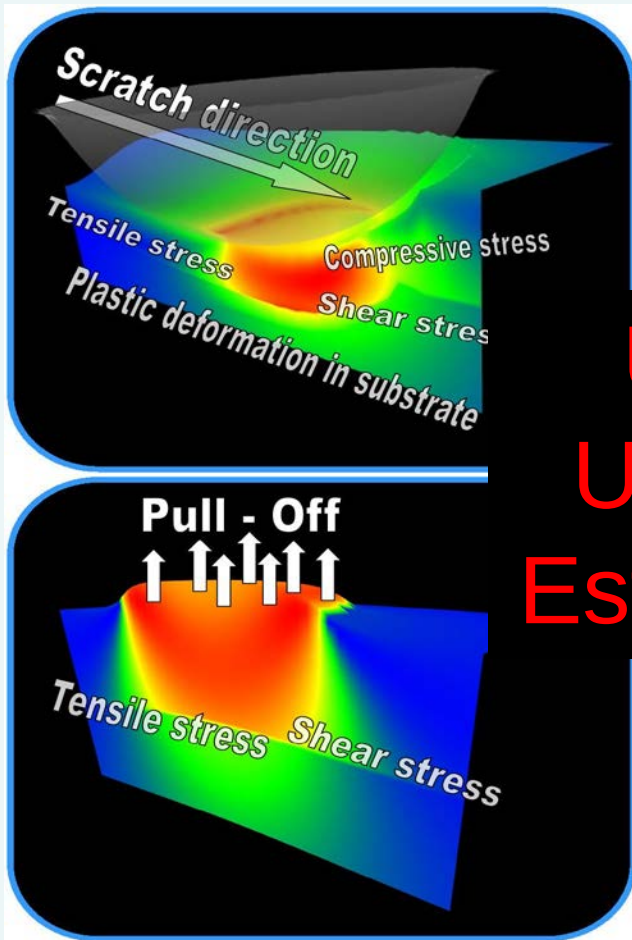
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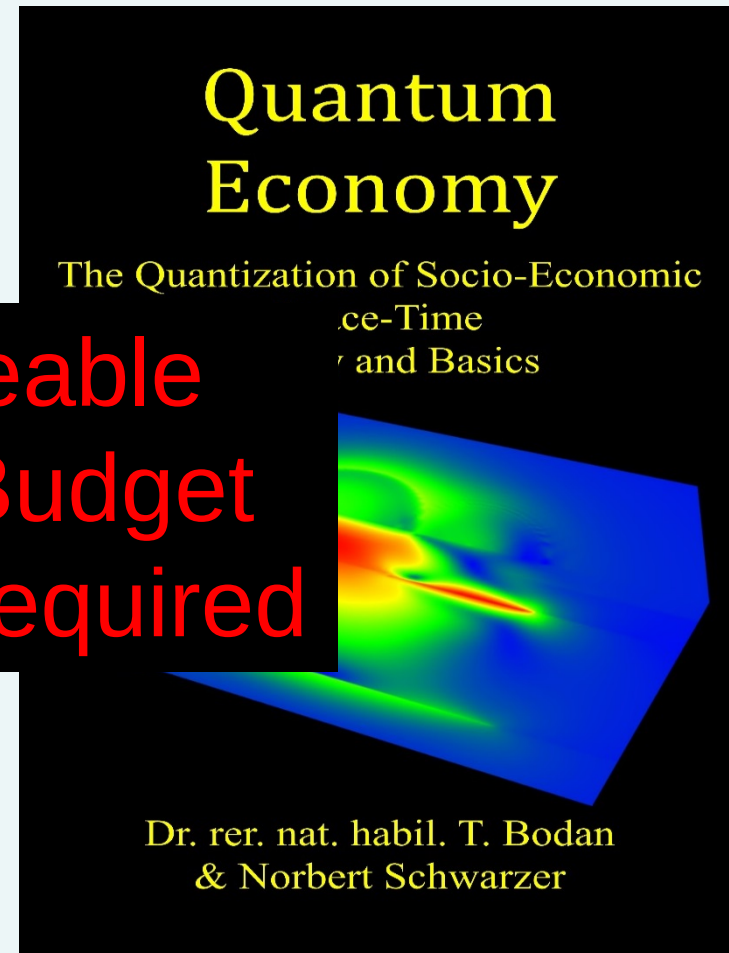
Market



Technical

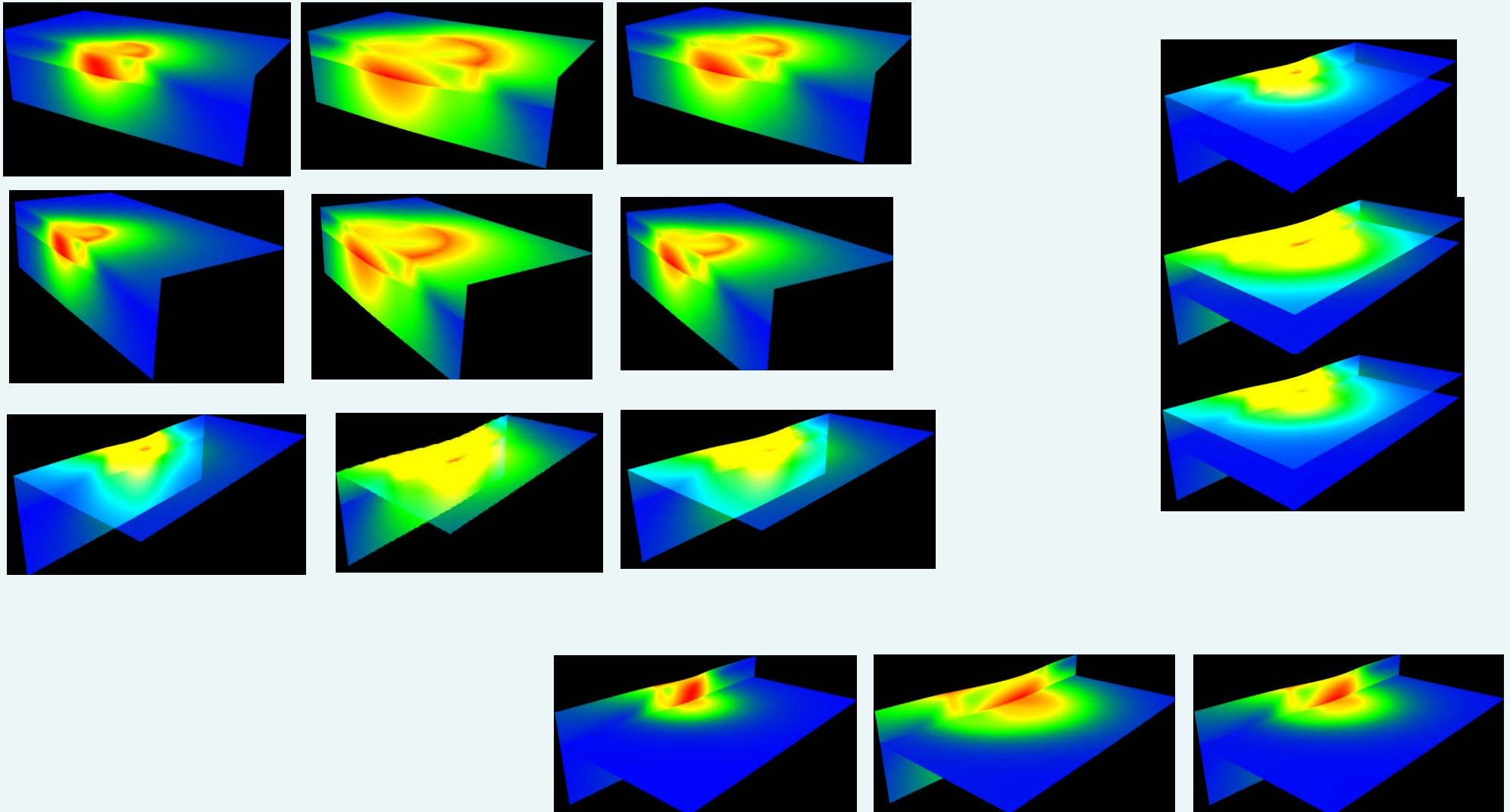


Market

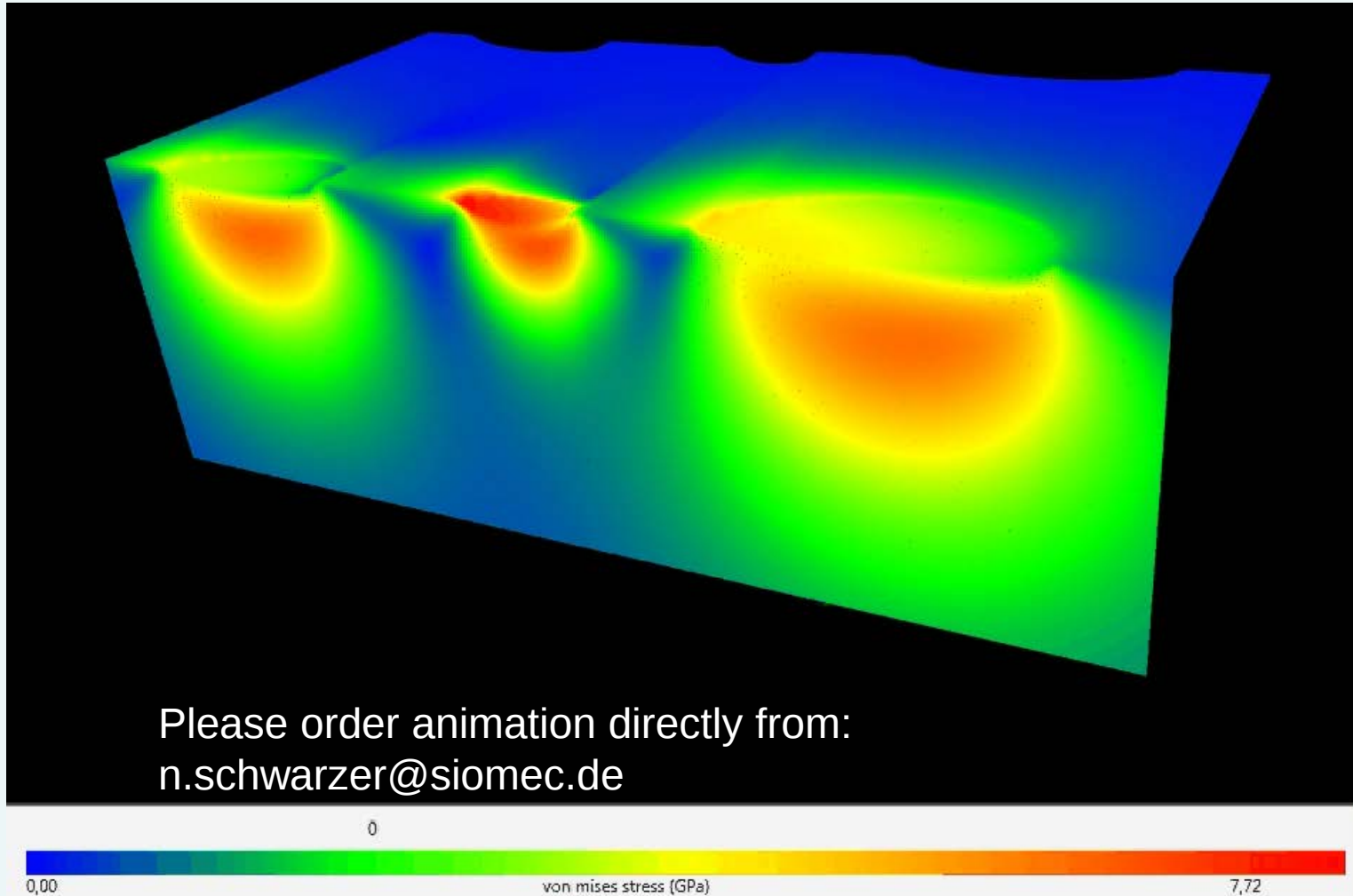


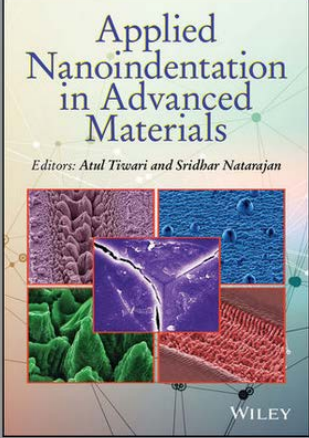
**Unchallengeable
Uncertainty Budget
Estimation is required**

Now we are ready for the real stuff



Summing up





Applied Nanoindentation in Advanced Materials
Editors: Atul Tiwari and Sridhar Natarajan

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Applied Nanoindentation in Advanced Materials

Atul Tiwari (Editor), Sridhar Natarajan (Co-Editor)

ISBN: 978-1-119-08449-5

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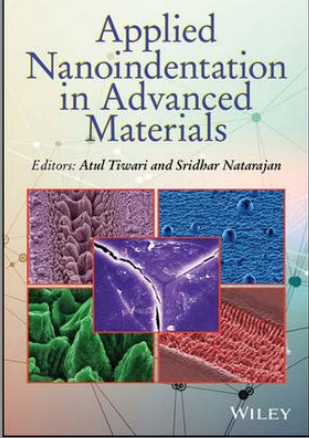
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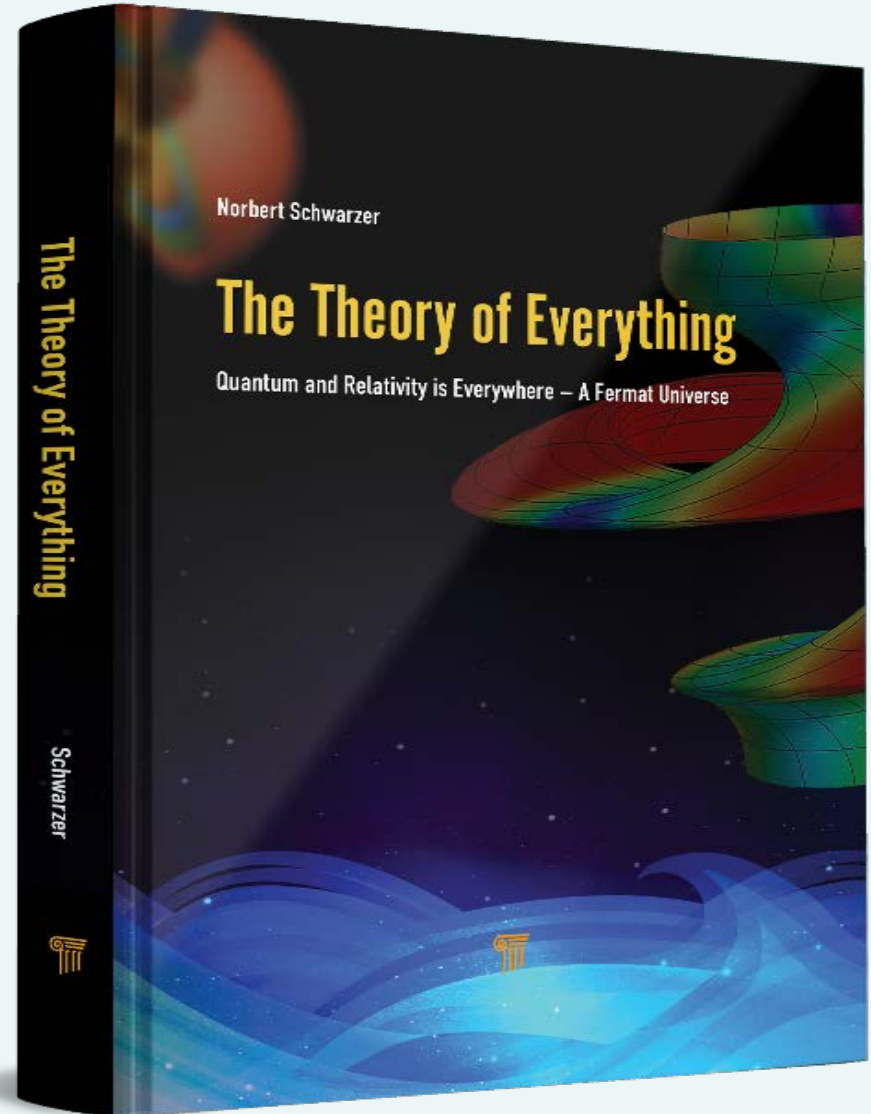
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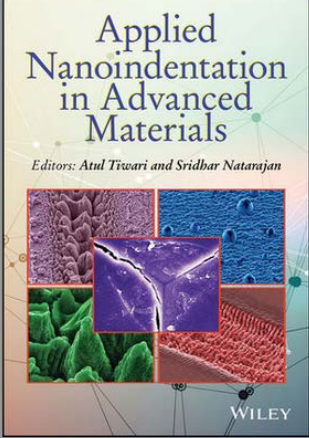
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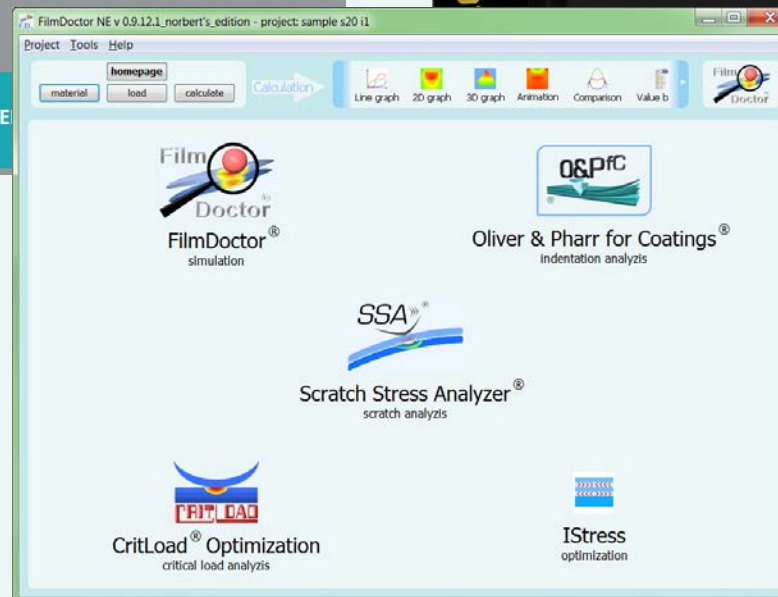
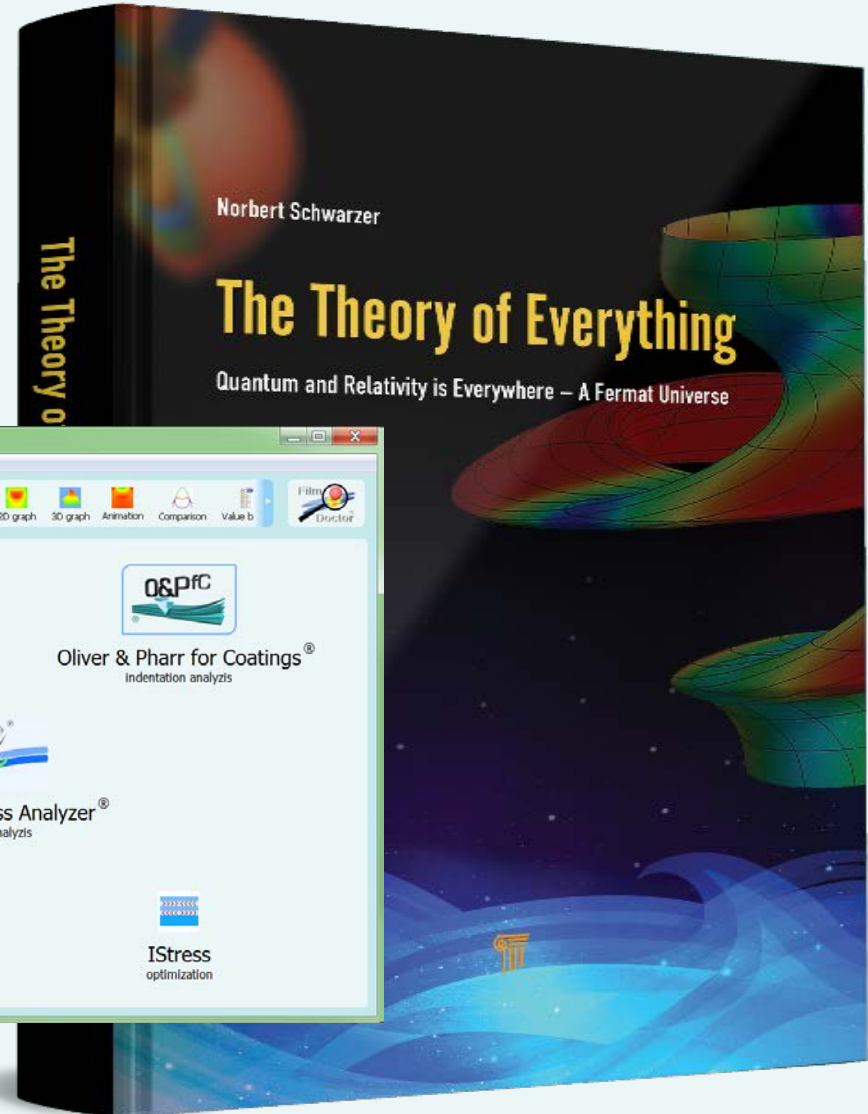
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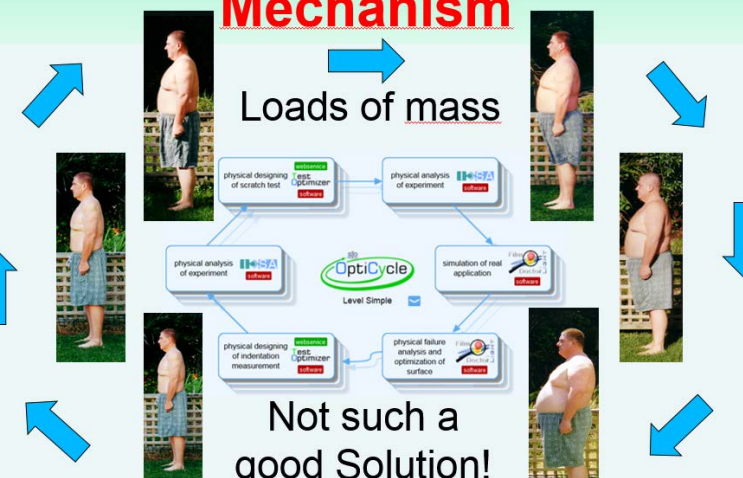


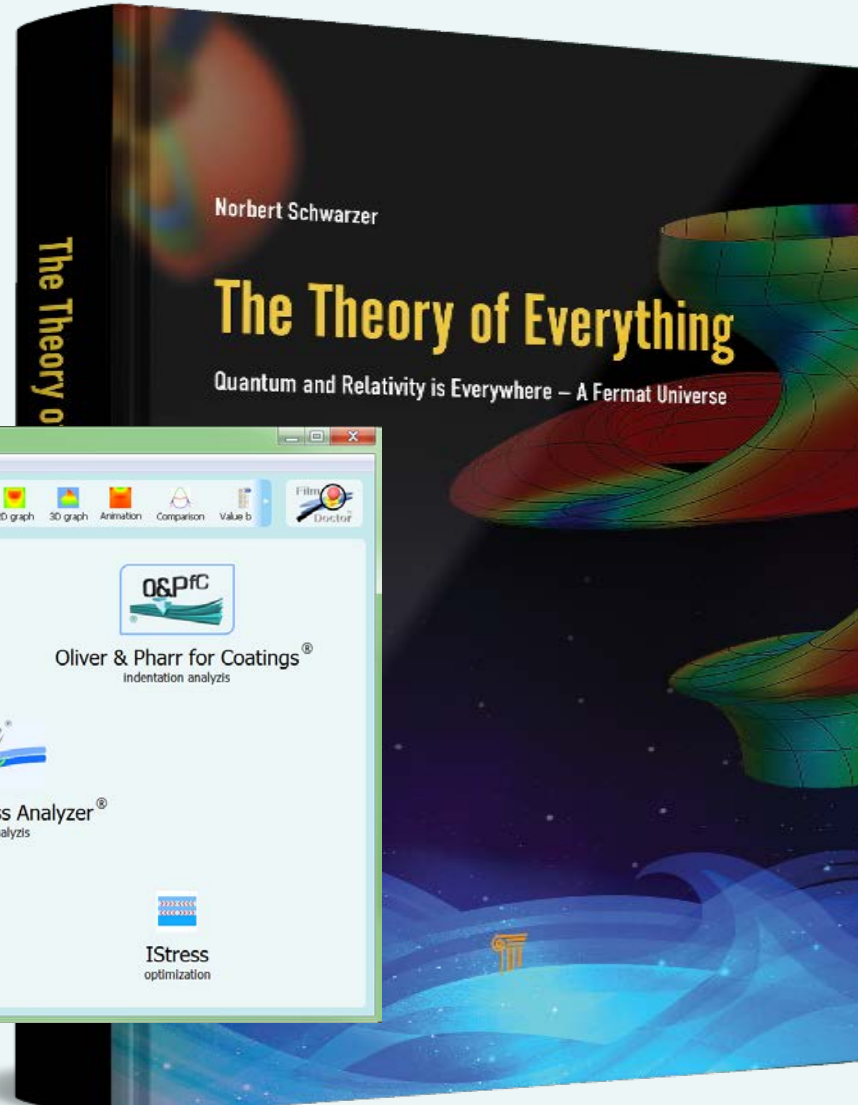
Applied Nanoindentation in

Interpretation as a Higgs Field Mechanism

Loads of mass

Not such a good Solution!





Norbert Schwarzer

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Quantum and Relativity is Everywhere – A Fermat Universe

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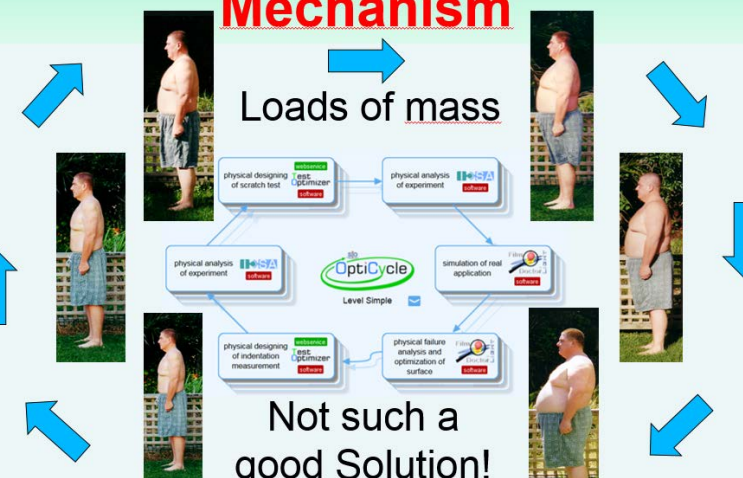
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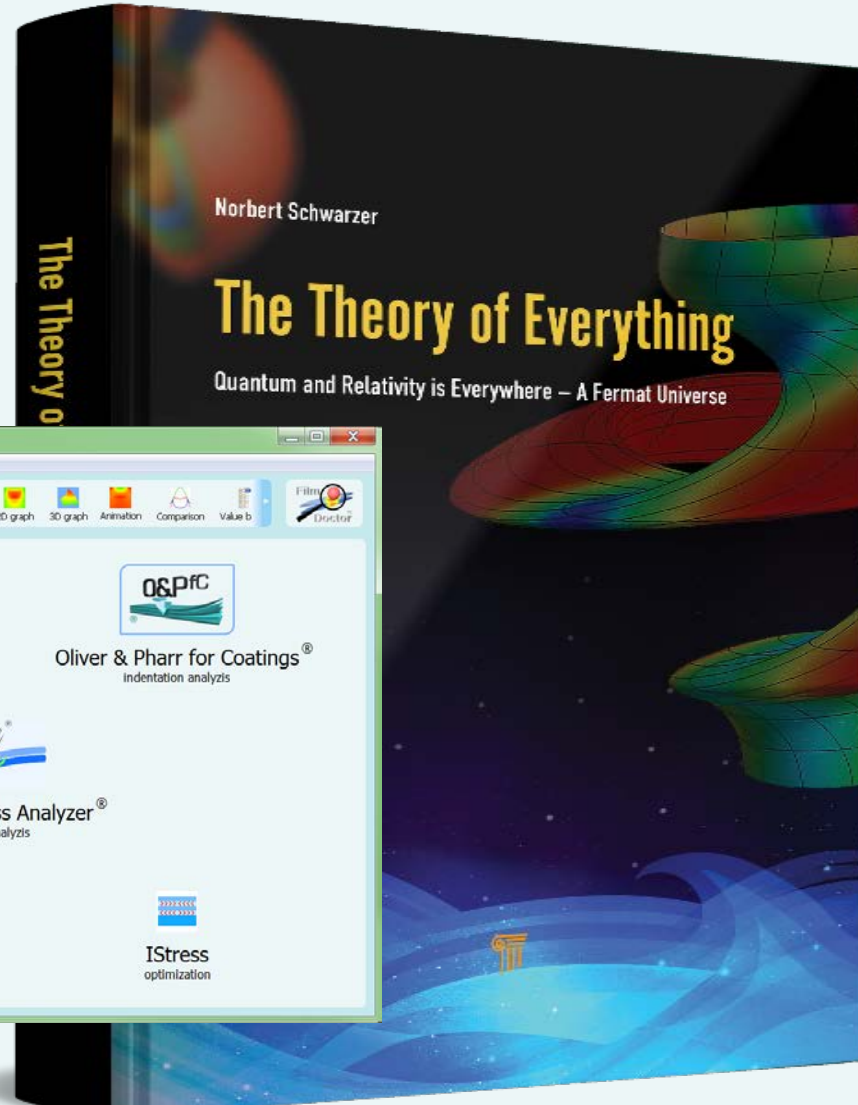
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