EPP drilling tool design

DEEPLIGHT - Novel concepts to construct cost effective geothermal wells with Electro Pulse Power Technology

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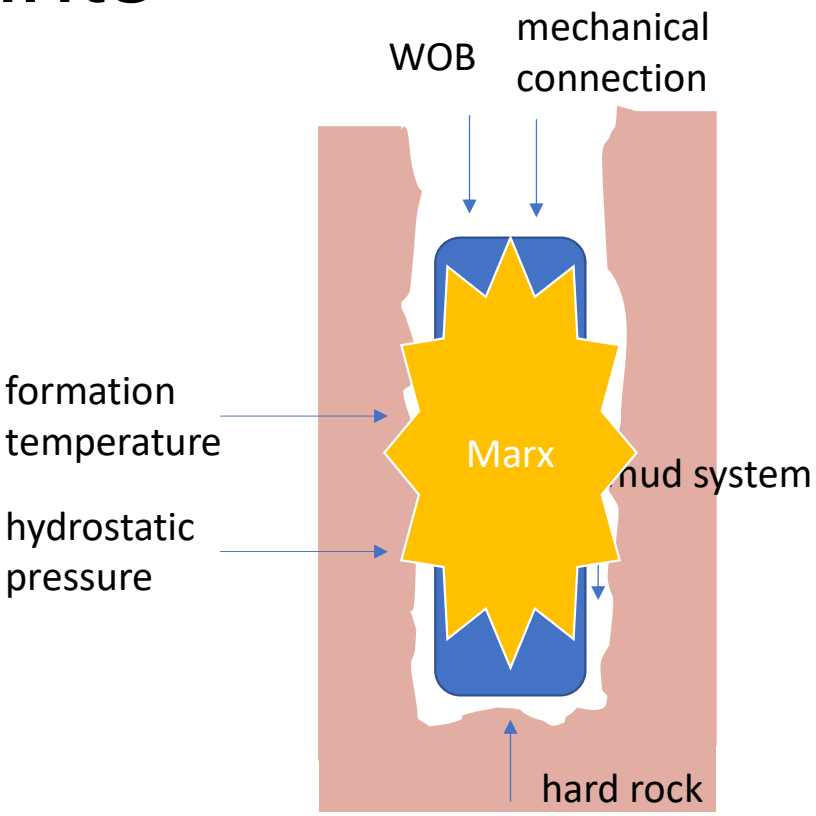
The project DEEPLIGHT is subsidized through the GEOTHERMICA and JPP Smart Energy Systems Joint Call by Netherland Enterprise Agency, RVO, German Federal Ministry for Economic Affairs and Energy BMWi, Icelandic Research Institute, RANNIS, The Scientific and Technological Research Council of Turkey, TÜBİTAK, United States Department of Energy, DOE.
The contents of this presentation reflect only the view of the author(s) and do not necessarily reflect the opinion of any of these funding agencies.

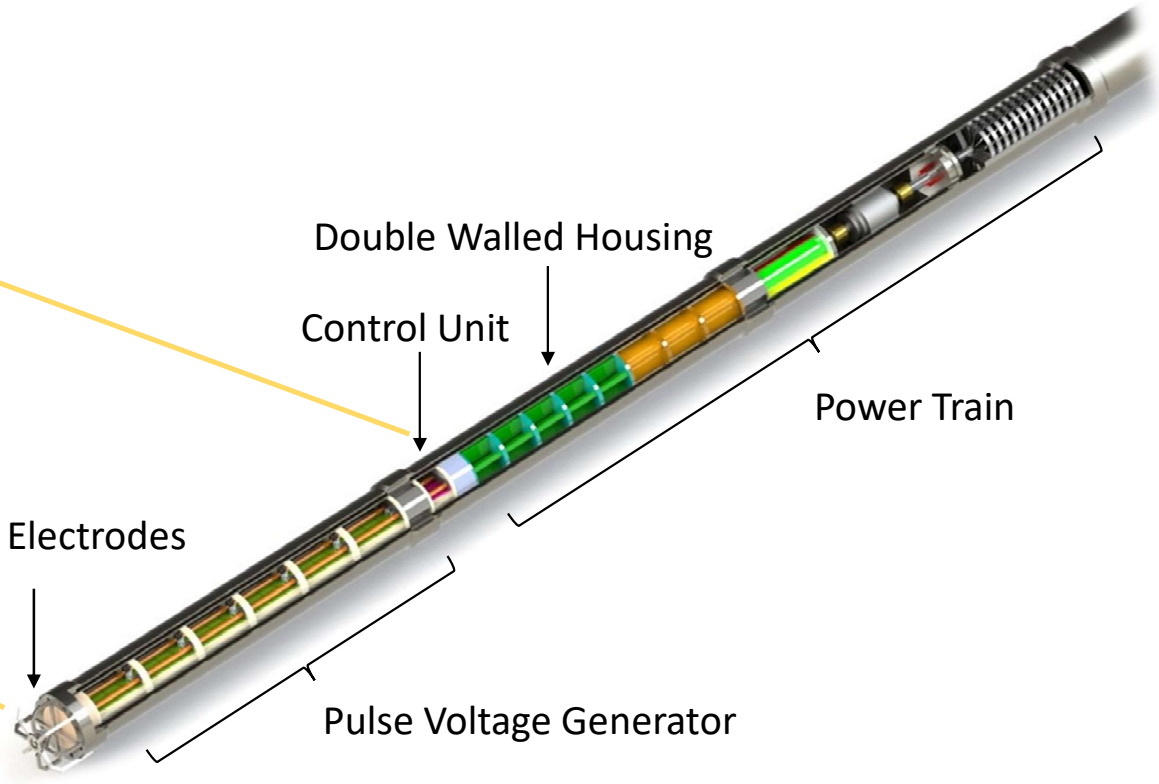
State of the Art

- First prototype of EPP drill bit
- 12 ¼“
- Successful test in granite in OBM

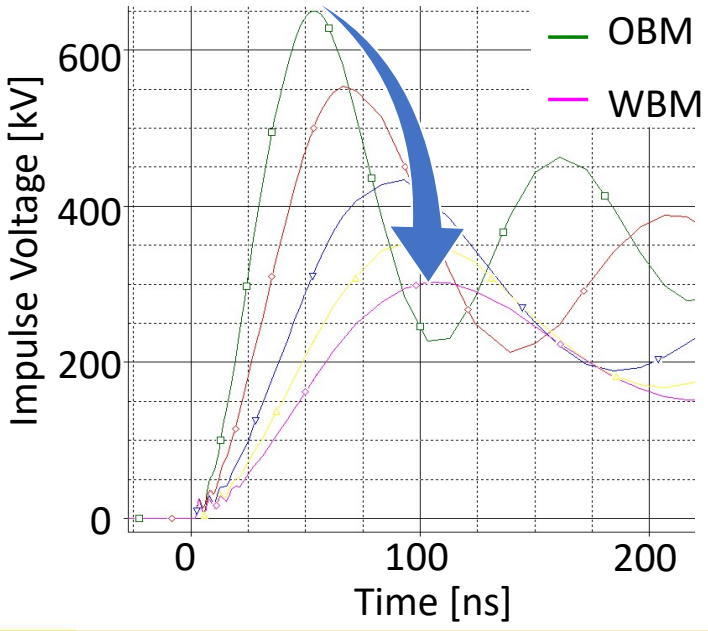
Constraints



Machine Concept



Current Challenge: WBM

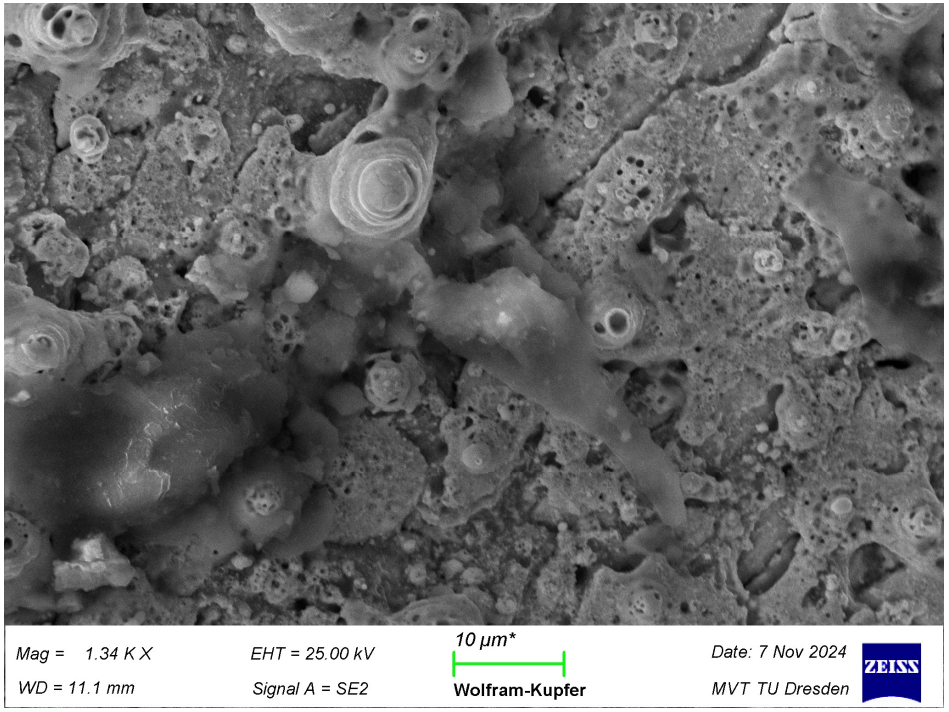


higher permittivity, higher conductivity → lower amplitude, longer rise time → lower chance for discharge in rock

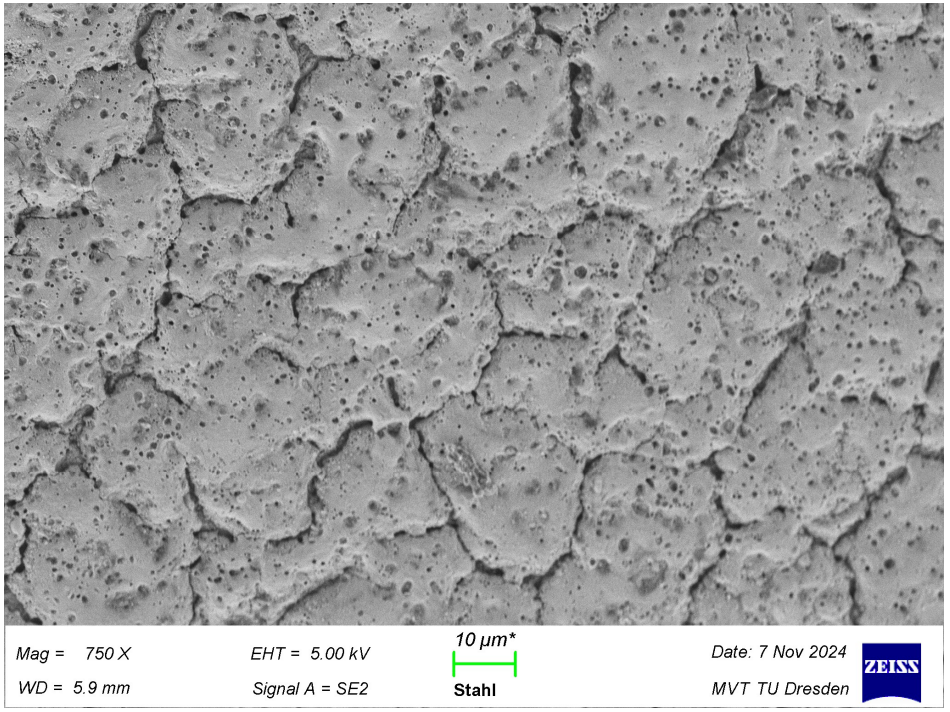
higher permittivity, higher conductivity → UV-light management, Lower electrode wear → Same performance as in OBM → reduced reliability of Marx generator

Erosion of Spark Gap Electrodes

SEM of: copper-tungsten

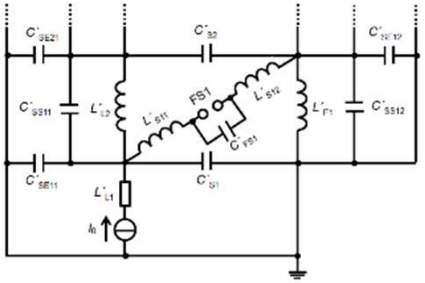


steel

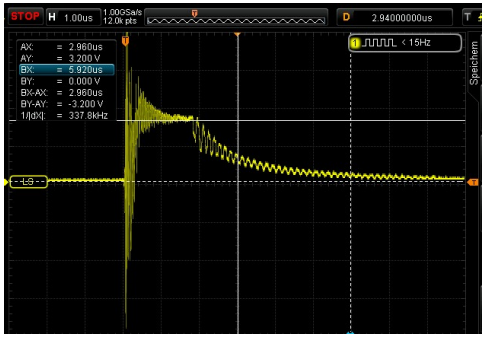


Other Methods and Topics

network simulation

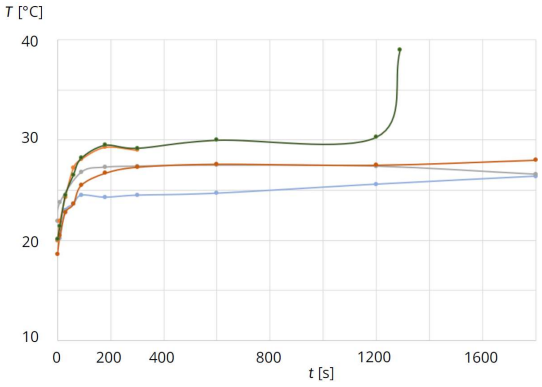


interpretation of damping

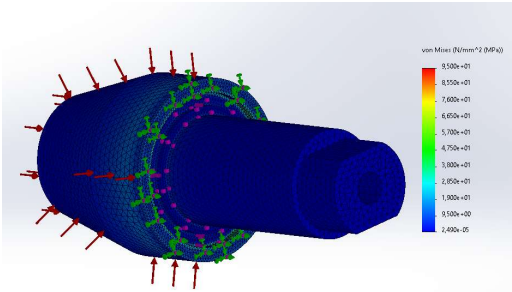


MSE-measurement

life time tests



Component development by FEM

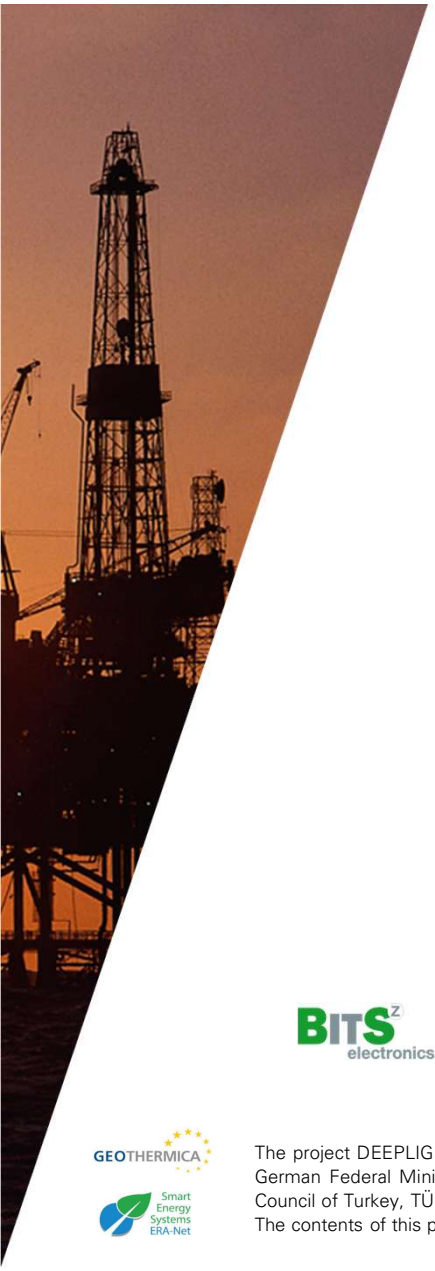


Further Research

- Interaction EPP – drilling mud
- Test of power train
- Full scale test of enhanced prototype

Further Research

Source: Dall-E3



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Deep Light

Thank you for your attention

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