

LUNCH&LEARN:

Microwave-assisted hard rock cutting

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Current methods of mechanical excavation of rock limit the type of material which can be extracted economically; they are limited to a turn-off radius of $>12\text{m}$ and rock strength $>150\text{MPa}$. Therefore, there is a significant gap for a method (other than drill & blast) of rock extraction capable for turn-off radii below 12m and rock strength above 150MPa . There is motivation for research into and development of alternative extraction methods which could lead to new combined methods covering this gap. One of the possibilities to overcome these restrictions is irradiating the rock with microwaves to enhance an artificial crack network which will subsequently be exploited by mechanical tools.



This presentation reviews the corresponding background in mechanical excavation tools as well as microwave – material interaction, including discussion of scenarios of how this technology can be applied in future.



Dr. Philipp Hartlieb is a senior researcher at Montanuniversitaet Leoben, Austria. He holds a MSc in Applied Geosciences and completed his PhD as member of the Chair of Mining Engineering of Montanuniversitaet Leoben on *Investigations on the effects of microwaves on hard rock* in 2013. He received the Hugh E. McKinstry Fund student research grant from the Society of Economic Geologists in 2007 and was ranked 1st at Young Researchers Competition, Saint Petersburg State Mining University (RUS) in 2010.

His current research focuses on microwave irradiation of rocks and ores with the goal of enhancing mechanical excavation tools and / or mineral processing and is sponsored by industry and research funds.

Wednesday, December 7

12:00 p.m.*

Coolbaugh Hall 219

*LUNCH WILL BE PROVIDED



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