This research is funded by the European Union
(EIC, Pathfinder Programme, G.A. 101046937)

Deep U-tube heat exchanger breakthrough: combining laser and cryogenics gas for geothermal energy exploitation

7 Partners
5 Countries
1 Goal: Drilling with laser and cryogenic gas.
We believe that drilling can be done faster with a laser and deeper with the support of gas.

RED

Fraunhofer IAPT

Università degli Studi di Padova

Dipartimento di Geoscienze

Prevent CO_2

Geoserv

Wrocław University of Science and Technology

Consiglio Nazionale delle Ricerche
Institute of Geosciences and Earth Resources
igg

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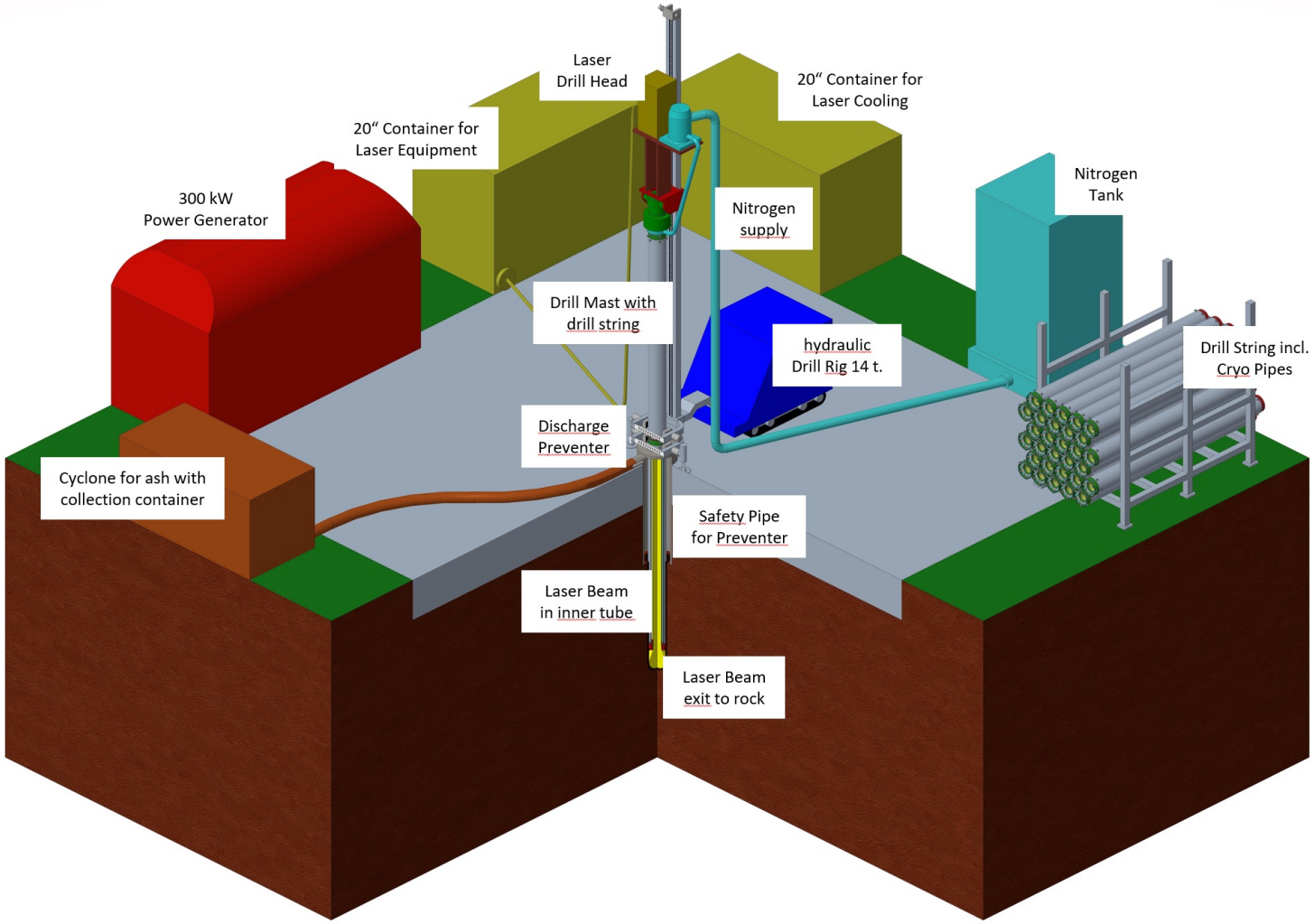
Drilling with laser and cryogenic gas

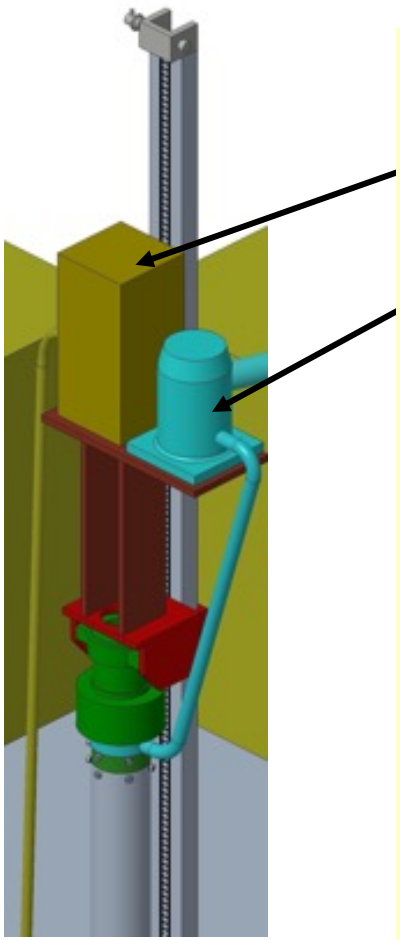


At the end of the DeepU we are able to drill with laser and liquid nitrogen.

The next step will be, drilling with laser and liquid nitrogen in an outdoor area.

This picture shows the main areas of research in the last 3 years.

The main components of the drill string



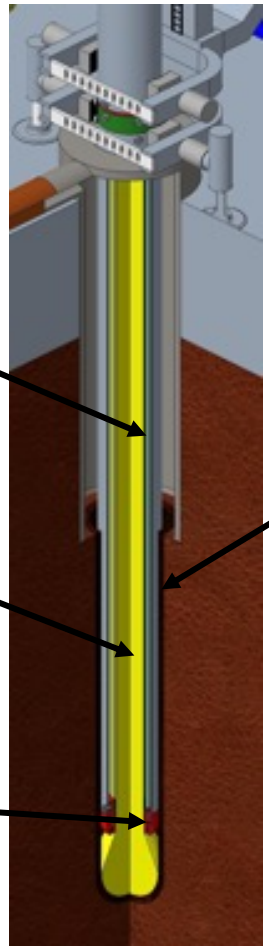
We have focused on 4 main components of the drill string:

- Laser entry head on top of the drill string.
  > > Fraunhofer IAPT

- Liquid nitrogen supply line from laser entry head to the bottom of the drill string.
  > > Wroclaw University of Science and Technology

- Laser drill string for lab and field applications with cryo pipes and a laser beam guiding through an inner tube.
  > > Prevent & Wroclaw University

- Laser beam exit head at the end of the drill string at the bottom of the bore hole.
  > > Fraunhofer IAPT



We have analyzed the molten borehole walls and the small particles produced during drilling.
> > University of Padua

We have focused on environmental, health and safety aspects that could potentially arise and worked out recommendations for prevention.
> > Terra GeoServ

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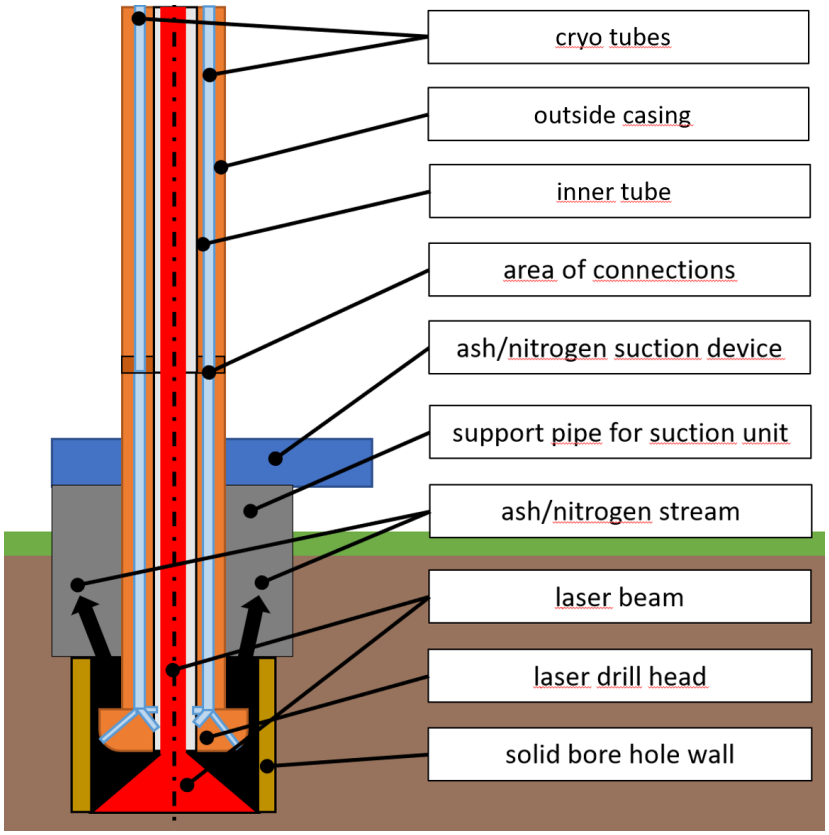
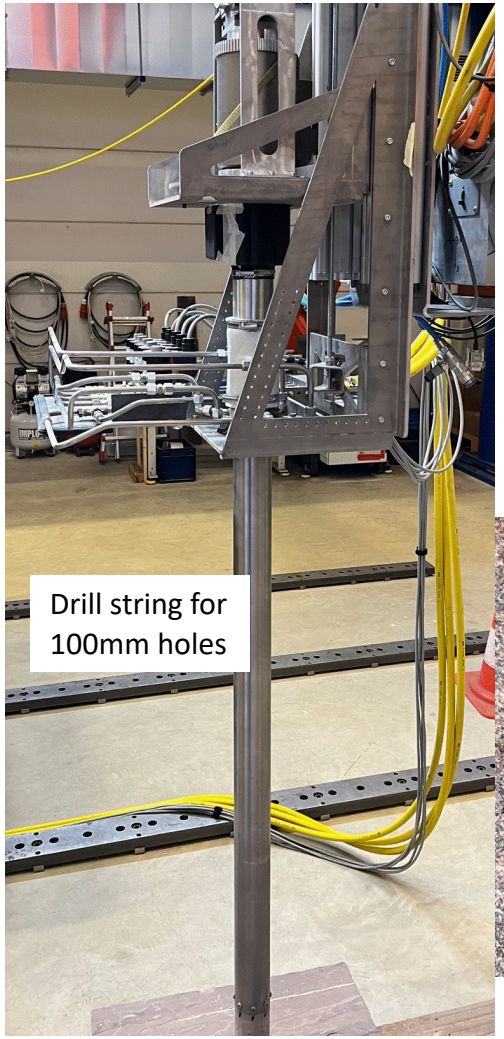
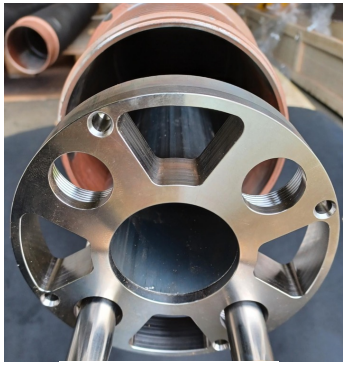
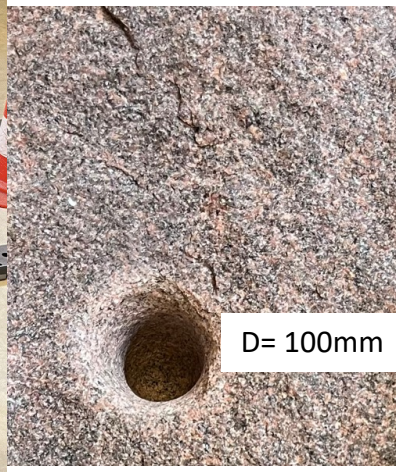
The laser drill string design







Drill string for
200mm holes



Olaf Steinmeier from Fraunhofer IAPT will continue.