

ITERATIVE IMPROVEMENTS TO THE CHIP TRANSPORT PUMP USED IN THE BEOI'S DEEP ICE CORE DRILLING PROJECT

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Transporting and collecting ice cuttings generated by the drill head is a necessary task for an ice-core drill. In boreholes stabilised by liquids, such as the one in Little Dome C in Antarctica as part of the BEOI project, this collection process can be enhanced by the use of pump devices placed between the core barrel and the chip collection chamber.

This presentation will showcase a newly redesigned pump used in the BEOI drill. The design is based on the proven technology of previously used pumps in deep coring projects, such as EPICA, GRIP and others.

The design objectives were threefold: to optimise the construction for CNC manufacturing; to eliminate unnecessary parts; and to adapt it into the new 4.5m drill while keeping it backward compatible. The most significant innovation of this revised design is the introduction of a new sealing solution that provides the required torque transfer and linear bearing of the pump in addition to the pure sealing function between the pump pistons and the outer barrel.

The development includes a dual-layer filter for the drive shaft inside the chip collection chamber. In addition, experimental testing is being conducted on a 3D-printed intermediate spiral booster that centres on the longest shaft and aids the flow inside the chamber.

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