



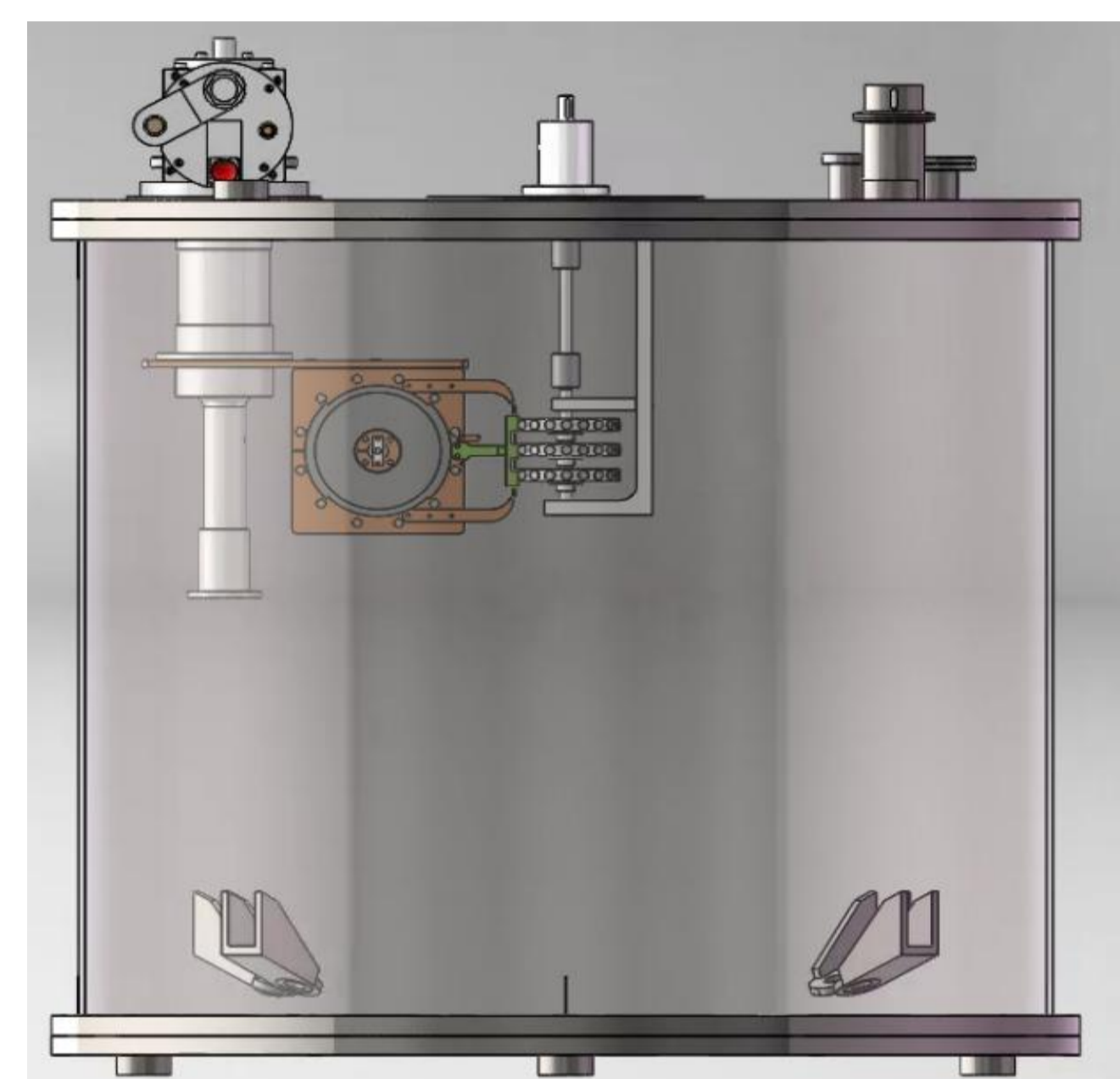
Conduction-cooled HTS Magnets Closed-loop System Excited by a rotating magnets flux pump

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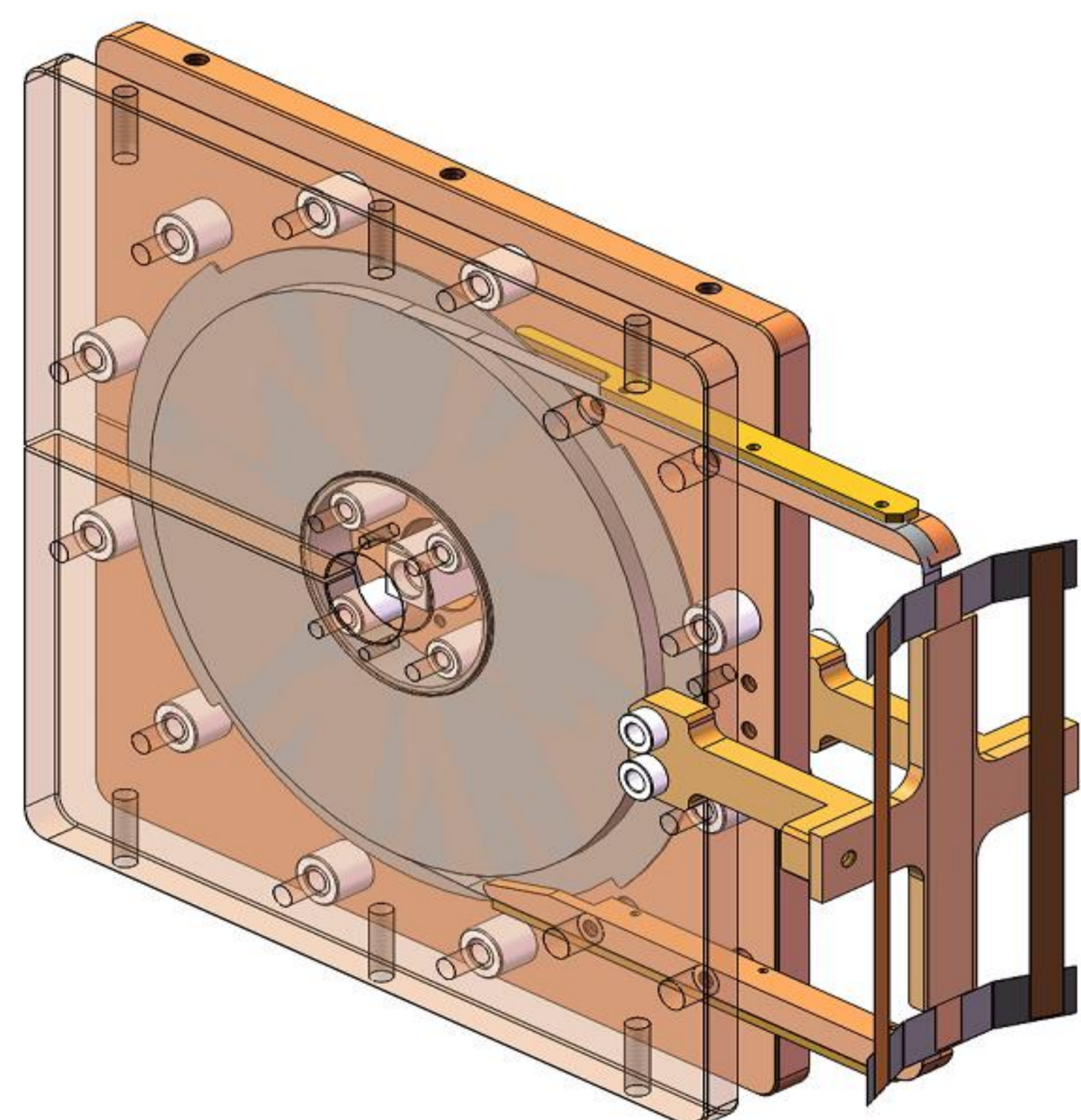
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I. Introduction

- A **conduction-cooled** flux pump is designed, which eliminates the need for expensive refrigerants and external power supplies.
- The superconducting **DPC coil** with large inductance is used to simulate the load magnet.
- The **excitation current, magnetic field stability** and other parameters are comprehensively measured and analyse.



II. Experimental design



➤ Copper plates should be placed on both sides of the double pie coil (DPC) to conduct cooling, and slotted from the center to the edge

➤ At the junction of the stator wire and the load coil, the cold is conducted by the upper and lower two sets of L-shaped fixtures

Parameter design of conduction cooling type flux pump

The rotor part of flux pump

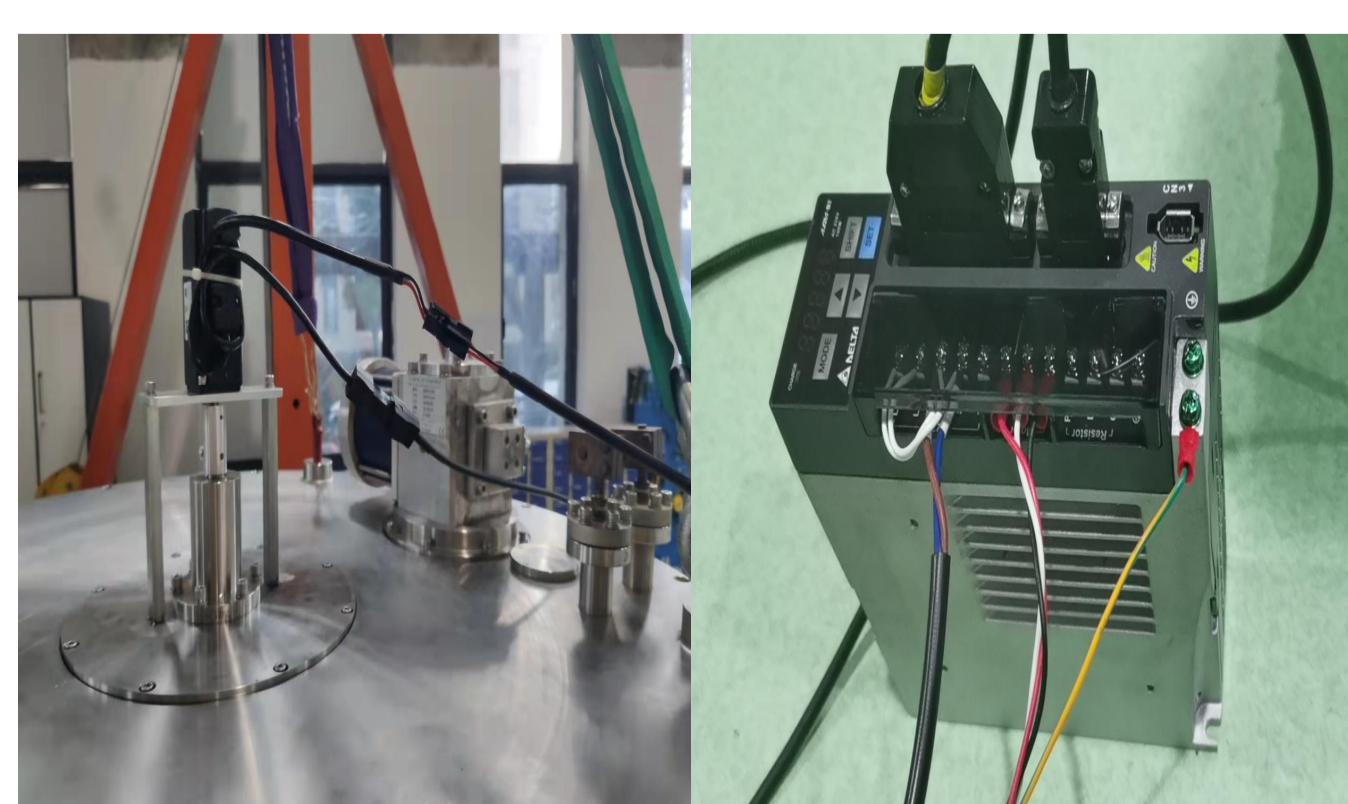
SmCo magnet

$B_m=3200Gs$

Diameter 10mm



Vacuum dynamic seal



Large inductance load coil

$I_C(40K)=117A$

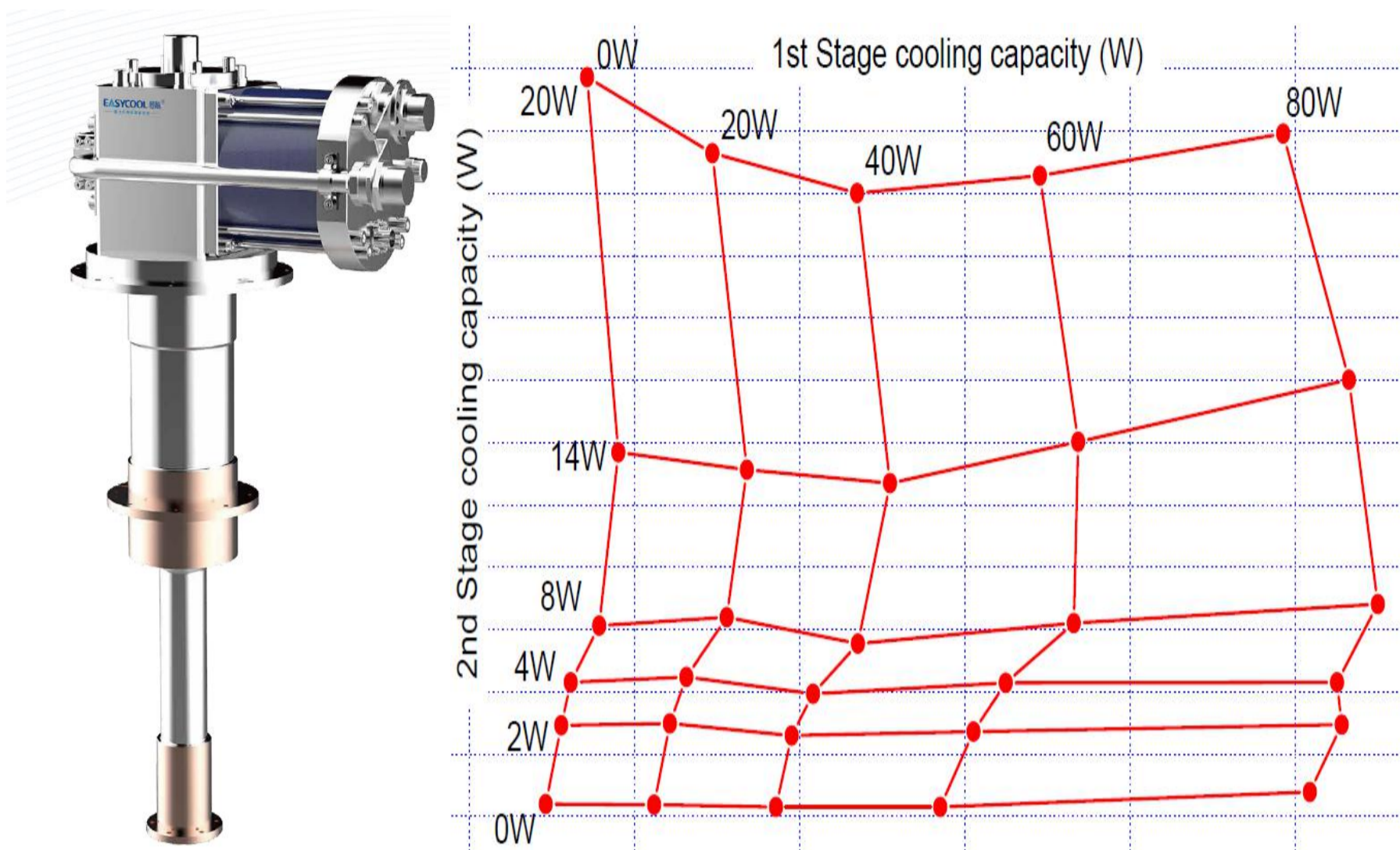
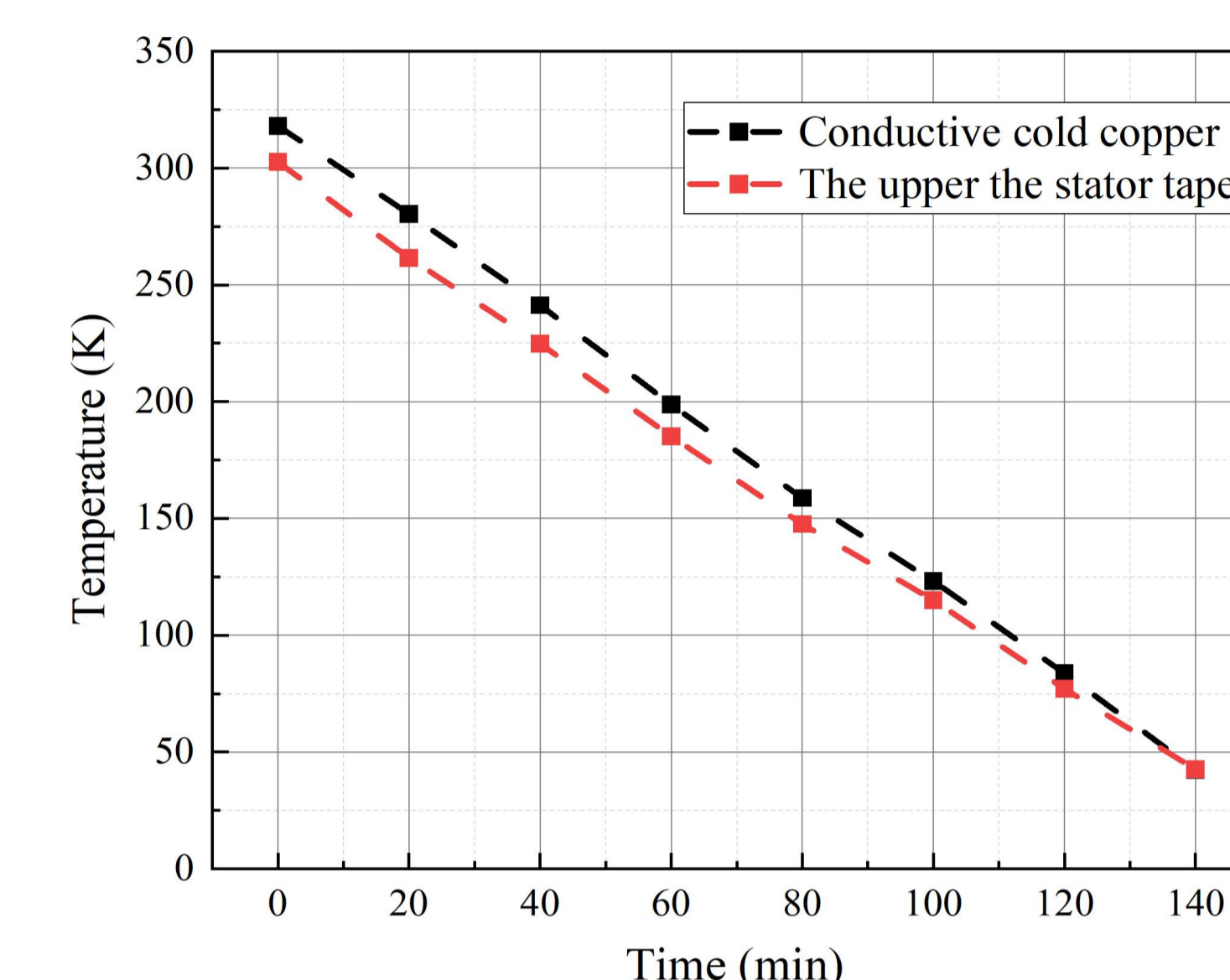
$L=27.3mH$

4mm YBCO

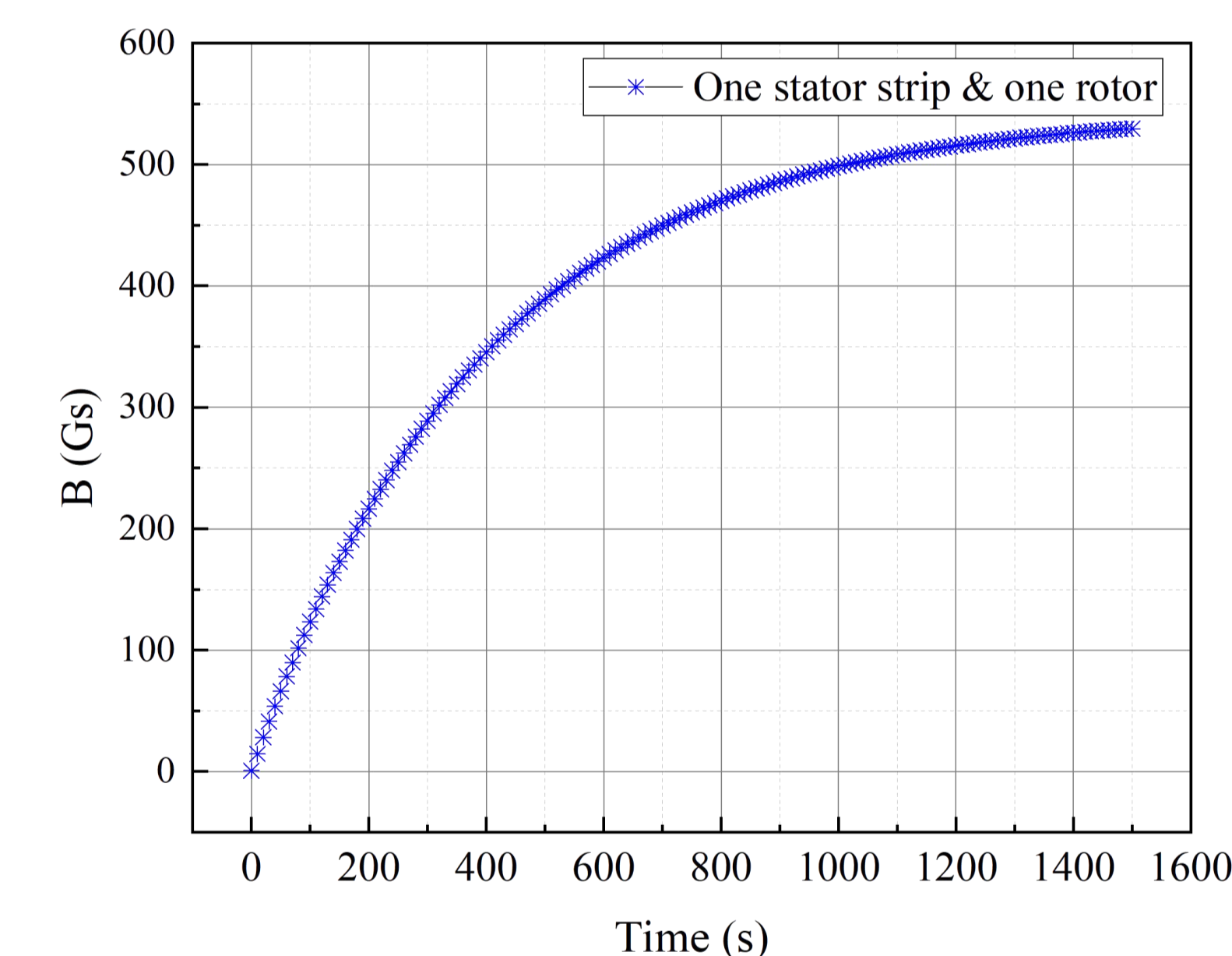


III. Results and discussion

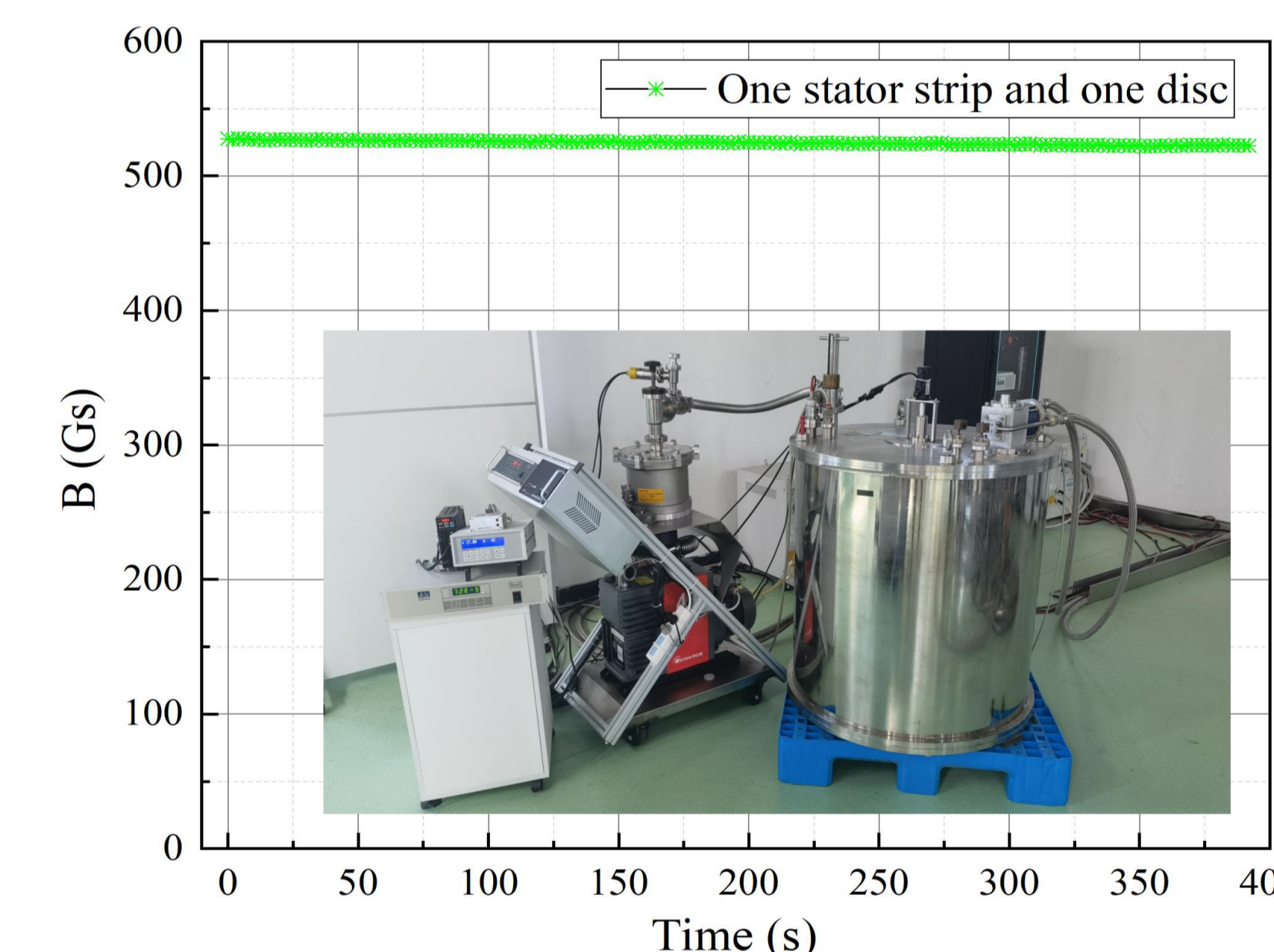
Refrigerator temperature characteristic curve



Excitation current



Magnetic field stability



The above results are for one stator strip & one rotor

IV. Conclusion

- Verifies the feasibility of excitation of high temperature superconducting flux pump in **30-50K** temperature zone.
- The structure **design of the flux pump** and the conduction cooling scheme of the coil and the stator.

Further improved

Enhance the amplitude of the excitation current
Enhance the stability of the magnetic field