

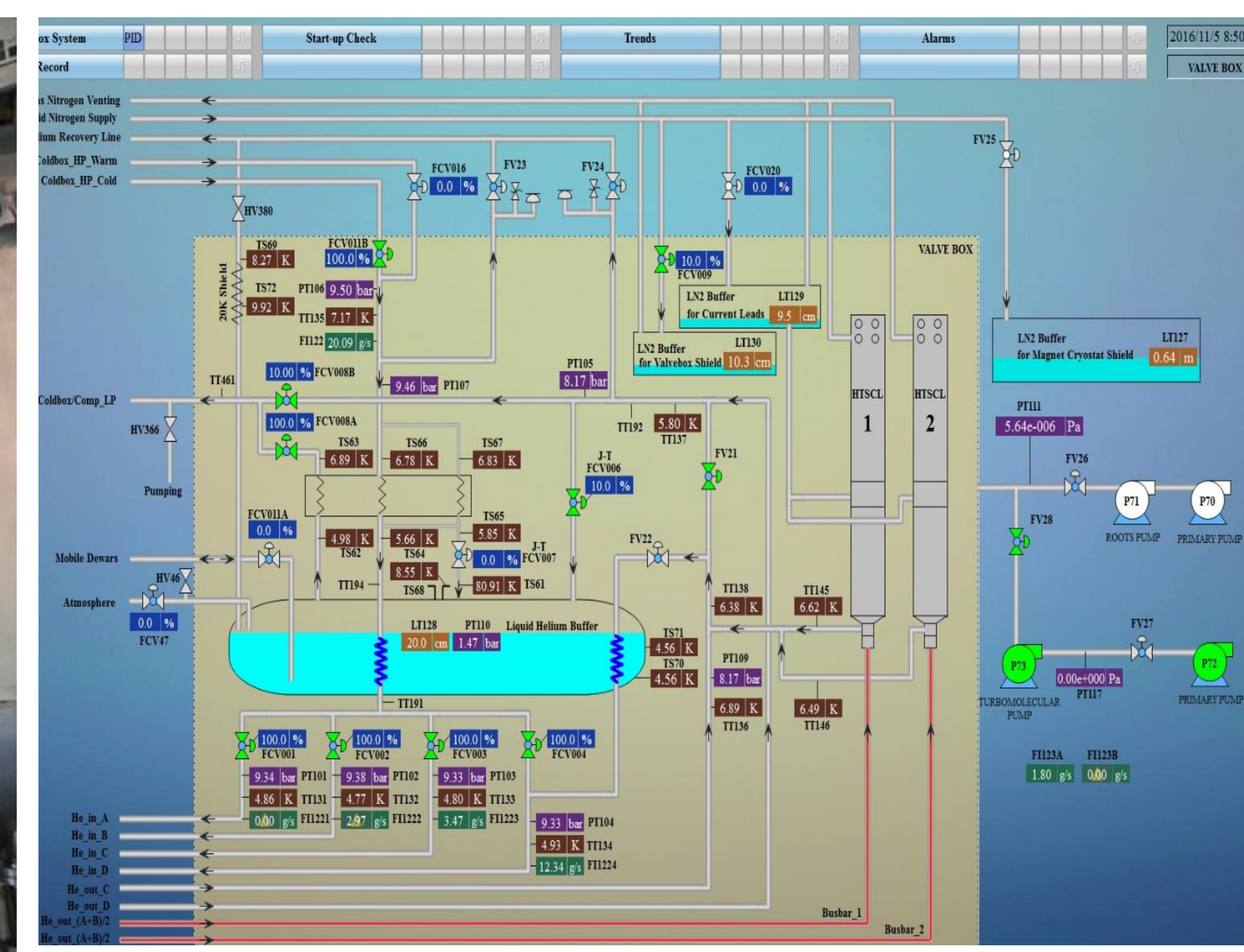
Magnetoresistance of The Cryogenic Linear Temperature Sensor

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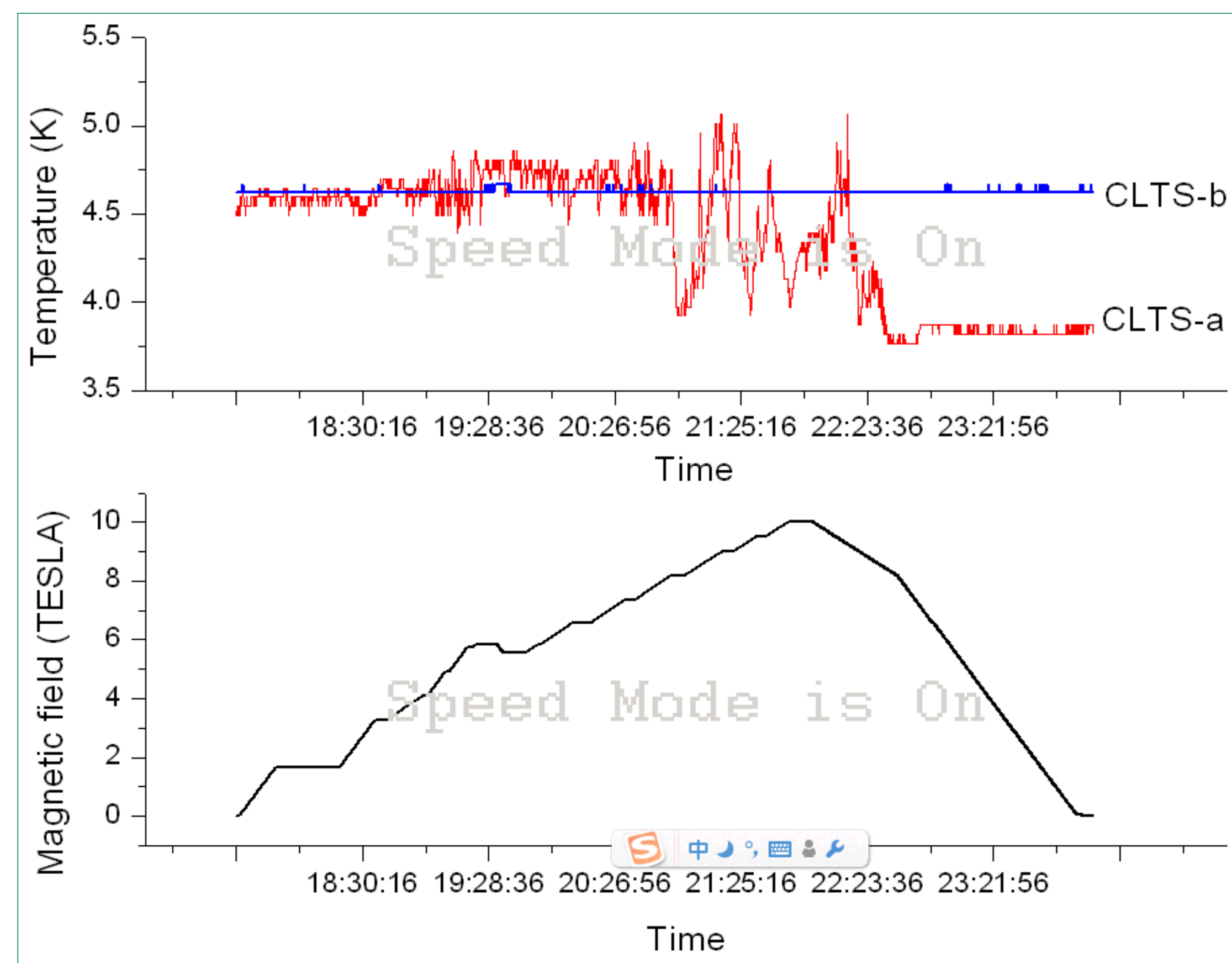
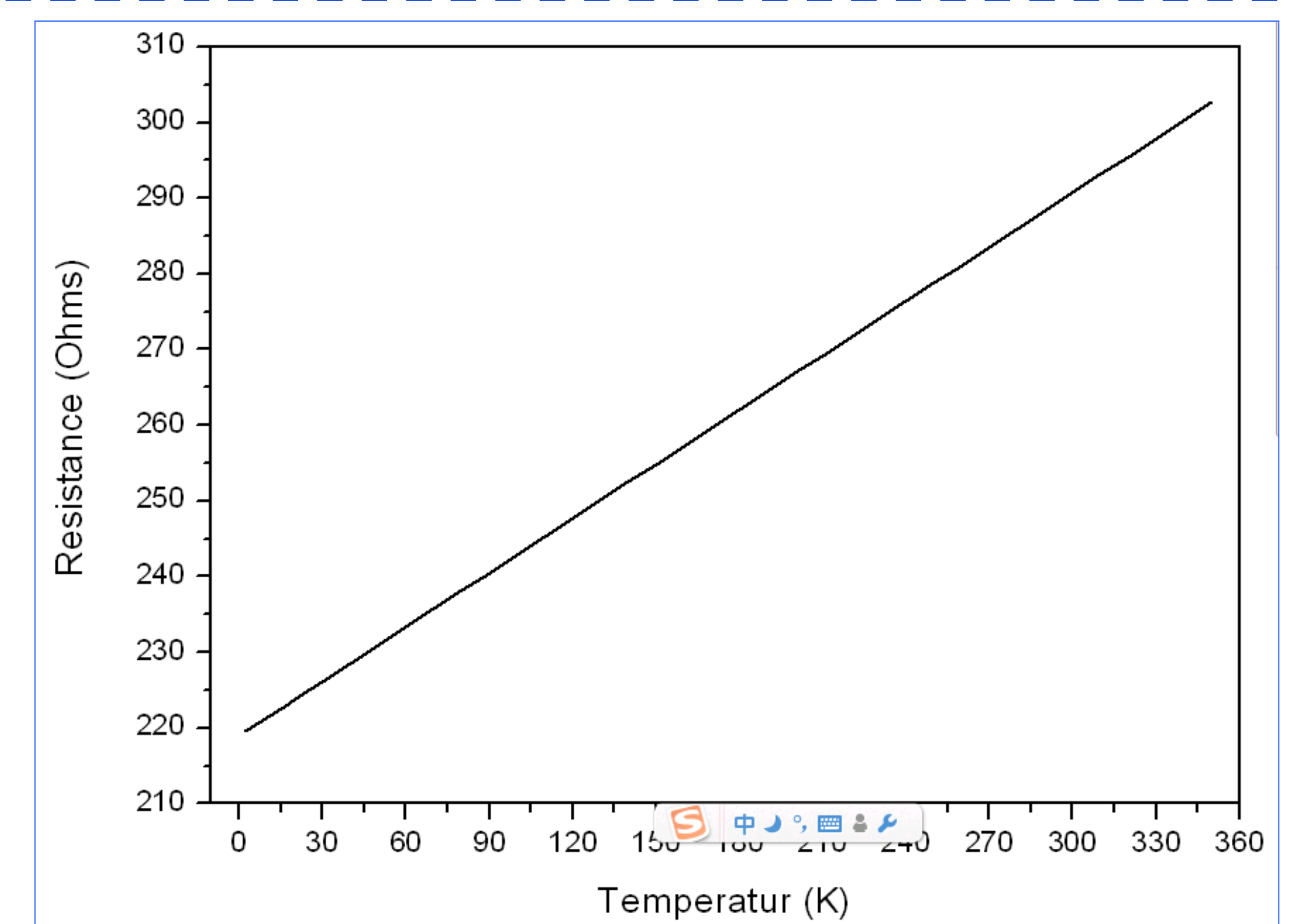
INTRODUCTION

40 T hybrid magnet combining a set of 30T resistive magnet with a 10T superconducting outsert, was carried out at High Magnetic Field Laboratory, Chinese Academic of Science (CHMFL). The superconducting magnet is forced flow cooled with supercritical helium at a temperature of 4.5 K and pressure above 5 bar supplied by the helium refrigerator system. The cryogenic Distribution Box distribute supercritical helium to the outsert superconducting magnets A,B,C,D coils through four control valves.



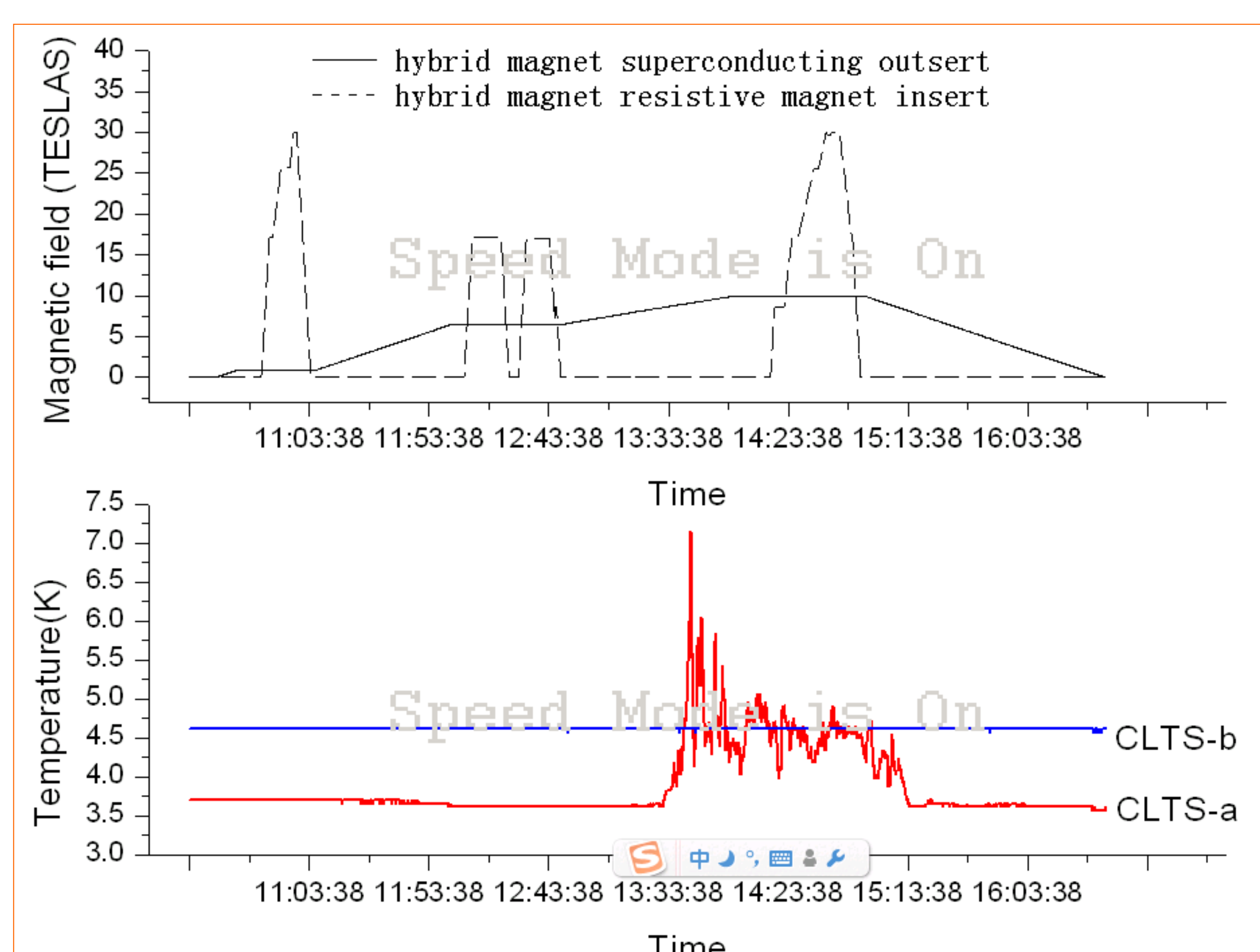
CLTS (cryogenic linear temperature sensor)

CLTS is used to measuring the cryogenic distribution box helium temperature CLTS is a small surface thermometer gage consisting of nickel and manganin alloys. CLTS resistance decreases linearly with temperature, The nominal resistance of the CLTS is 290 Ω or 220 Ω at 297 K or 4 K respectively. The sensor is strongly influenced by magnetic field.



Magnetoresistance of CLTS (10T)

The CLTS(CLTS-a) installing on the inlet of the superconducting outsert A coil, is the shortest distance (5.8m) of 40T hybrid magnet magnetic center, CLTS temperature fluctuated from 3.77K to 5.06K obviously when outsert superconducting magnet above 8.2T in the first 40T hybrid magnet testing, the CLTS produce resistance offset because magnetoresistance, and arised -0.783K offset. the other further CLTS sensors was no such appearance.



Magnetoresistance of CLTS (40T)

Hybrid magnet achieved 40T in the second time test, CLTS fluctuated from 3.662-7.19K obviously when superconducting outsert above 8.2T, For magnetoresistance, CLTS produce resistance offset again, and arised -0.1K offset. CLTS resistance is not affected by resistive magnet,.

