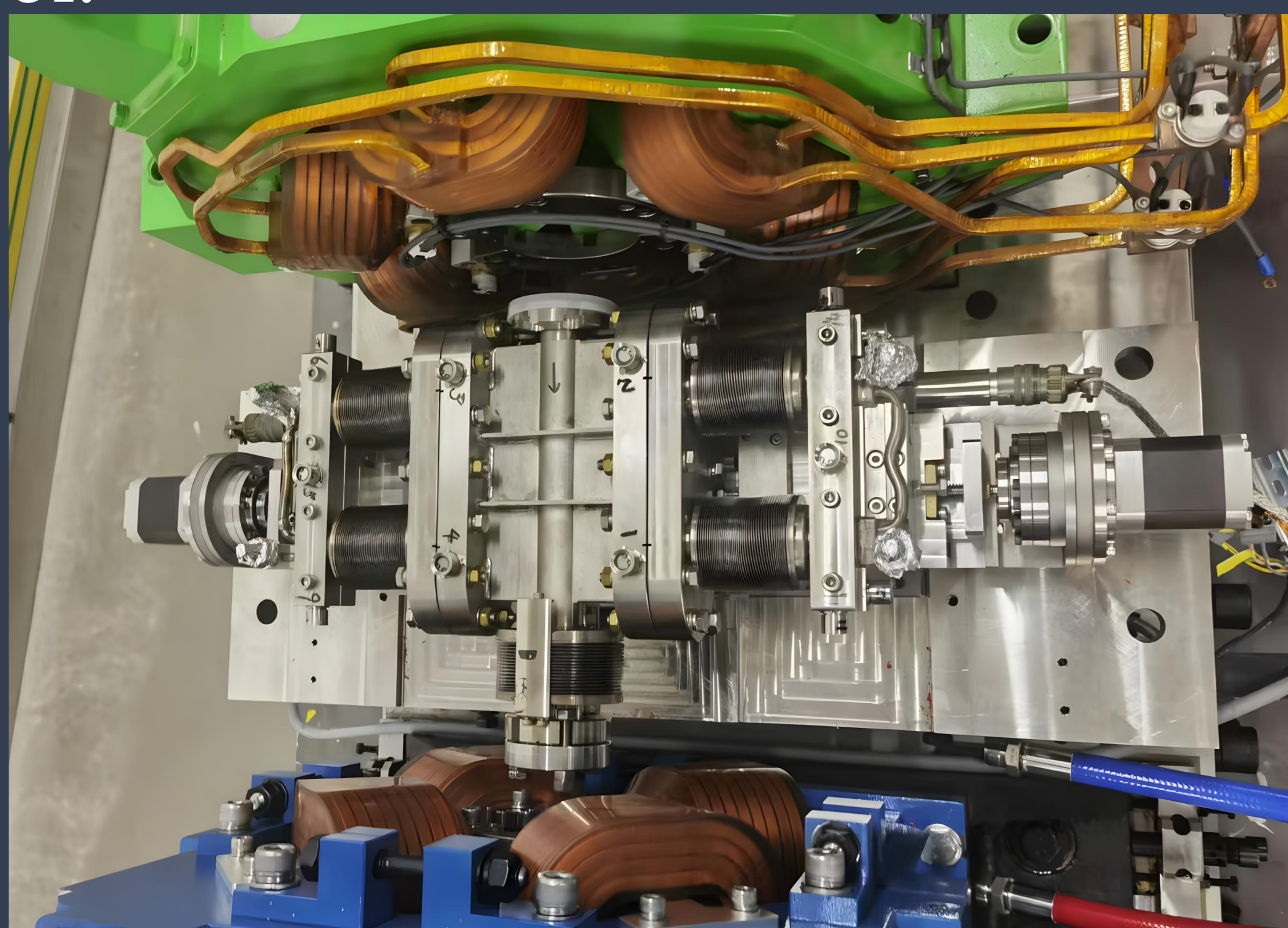


Design of Beam Collimator Control System For HEPS

Shutao Zhao, Haijing Wang, Chunhua Li, Jianshe Cao, Dapeng Jin, Nian Xie, Jia Liu, Siyu Chen
Institute of High Energy Physics, Chinese Academy of Science, Beijing, China

ABSTRACT

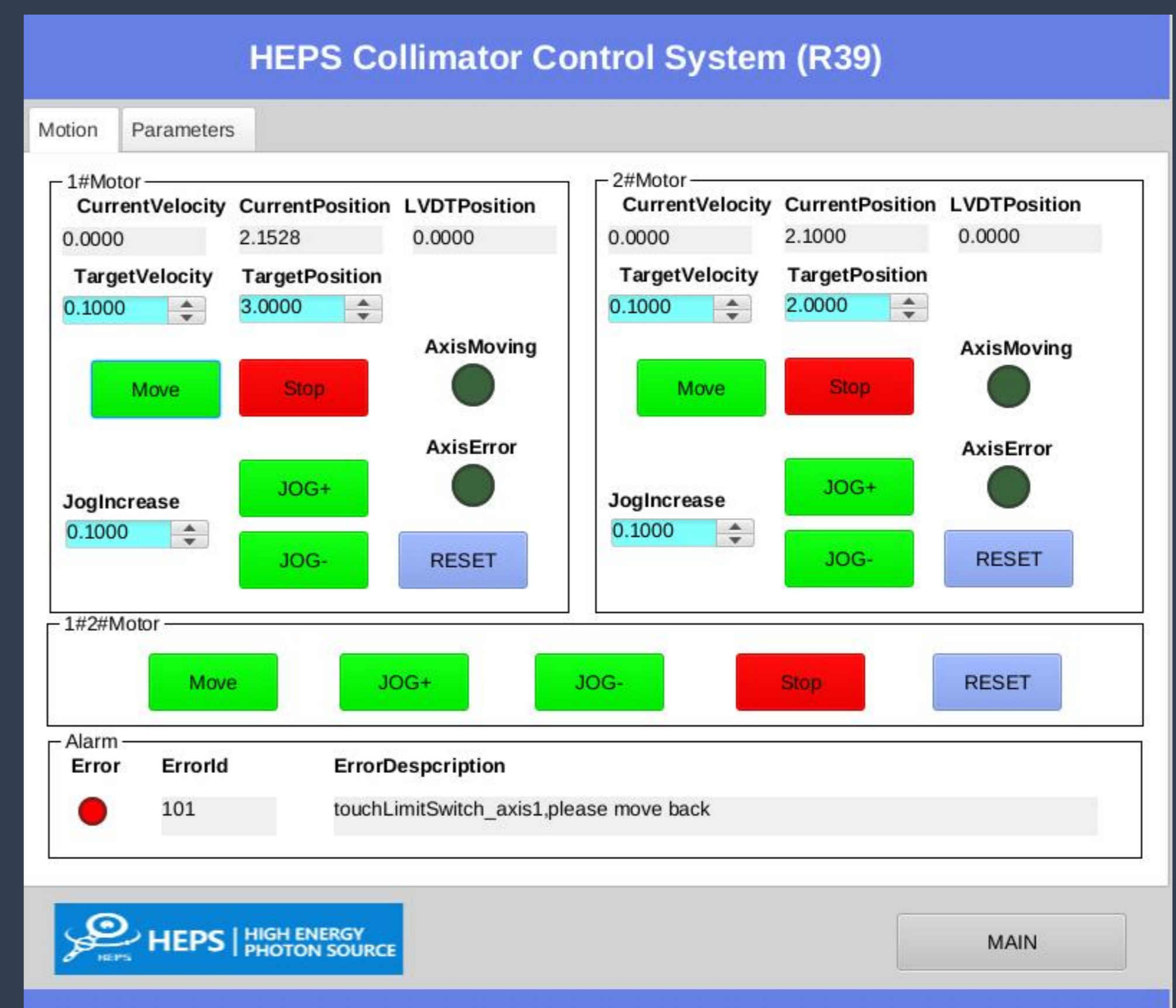
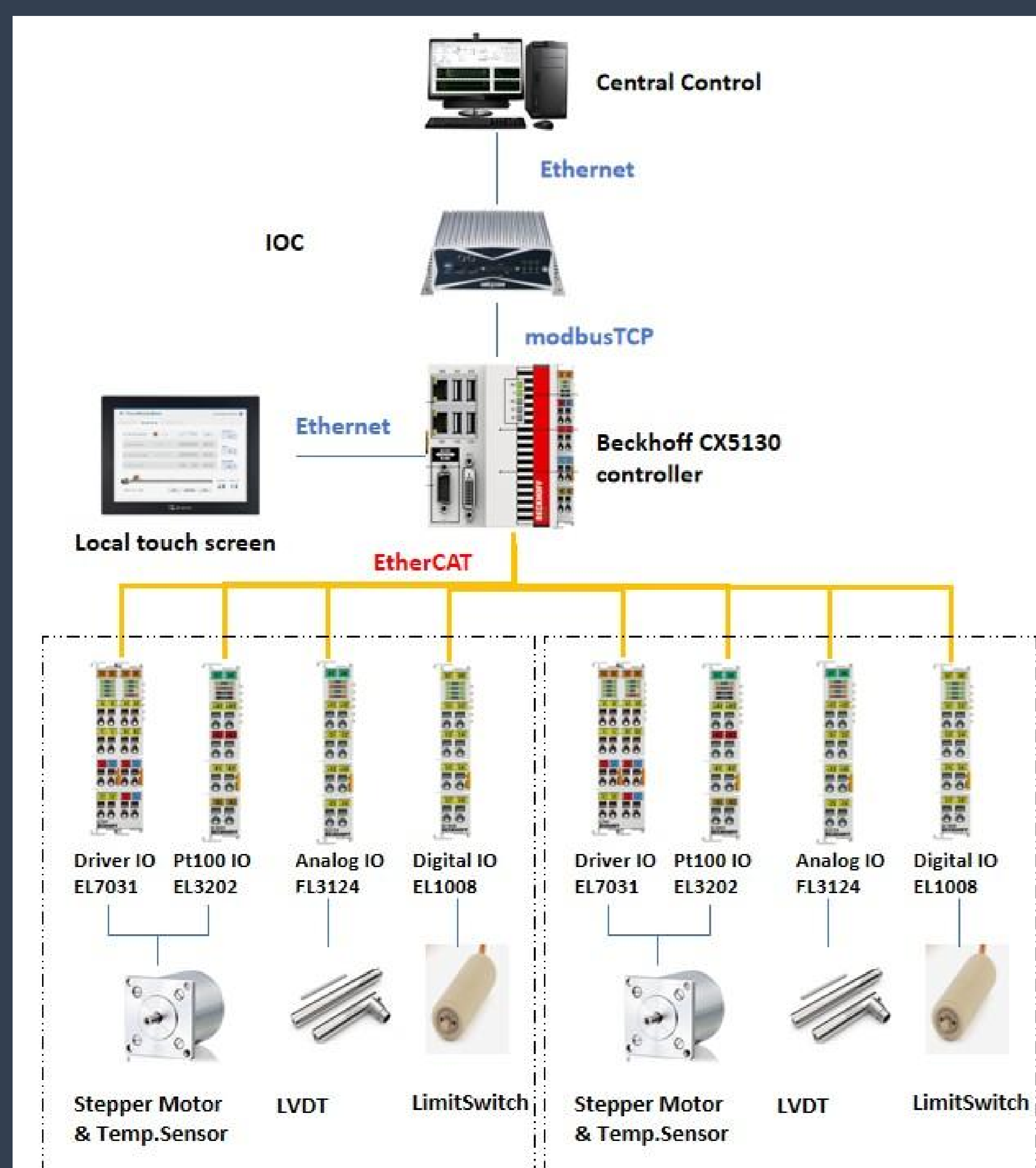
The collimator for the High Energy Photon Source (HEPS) intercepts lost particles and reduces beam losses. Utilizing EtherCAT industrial Ethernet technology, the control system achieves precise control, validated by a repeatability of ± 0.01 mm. EPICS with MODBUS TCP is applied for remote control.



- **Absolute Position Calibration:** In a high-radiation environment, an LVDT sensor is used to achieve high-precision positioning.
- **Safety System Design:** Multiple layers of safety protection, including software limits, mechanical limit switches, and emergency stop switches.
- **Remote Control:** Realization of remote control via MODBUS/TCP protocol communication between Beckhoff PLC and EPICS IOC.

SYSTEM DESIGN

- **EtherCAT Control Architecture:** EtherCAT industrial Ethernet technology for precise control in a distributed system design.



SYSTEM TEST

- **Testing Method:** Repeated measurements using a MITUTOYO digital micrometer gauge to verify motion precision.
- **Results:** The repeatability precision of the collimator reached ± 0.01 mm, meeting the technical specifications.

