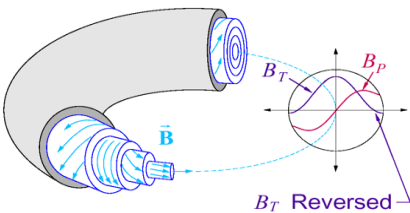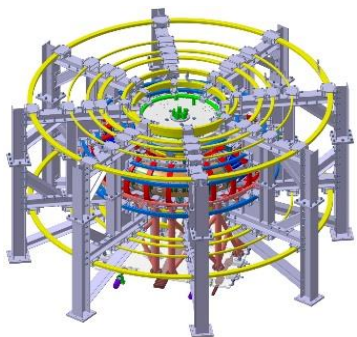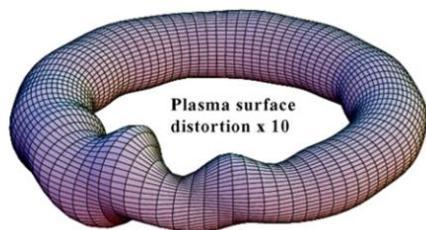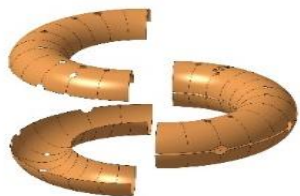# The Software Platform of LabVIEW-FPGA-Based Real-time Processing System in Keda Torus eXperiment

Introduction to KTX

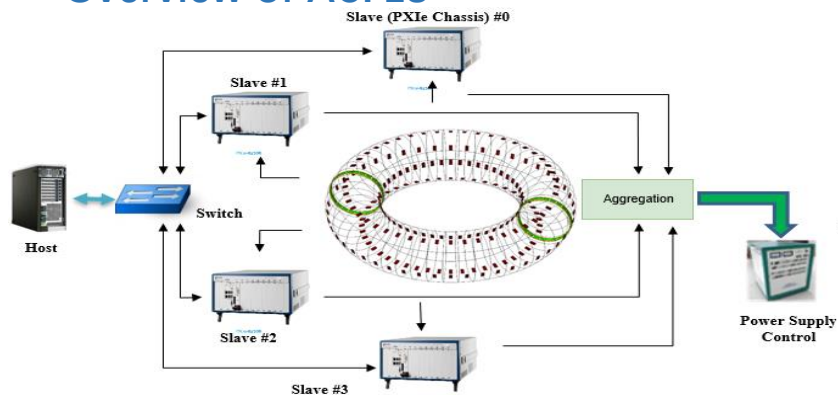Keda Torus eXperiment (KTX) is a **reversed field pinch** magnetic confinement device in China.


Plasma surface distortion x 10

The double C vacuum chamber structure makes great contribution to the instability of plasma. (**MHD instability**)

Overview of ACFES

Slave (PXIe Chassis) #0
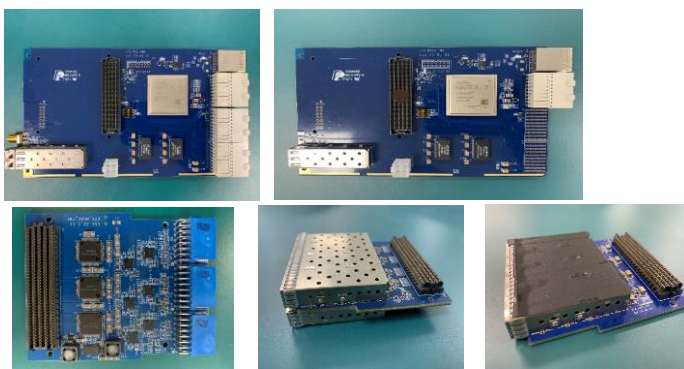Slave #1
Host
Switch
Aggregation
Slave #2
Slave #3
Power Supply Control

We implemented an active control feedback electronics system (**ACFES**) to mitigate the MHD instability (real-time analysis of MHD instability modes).
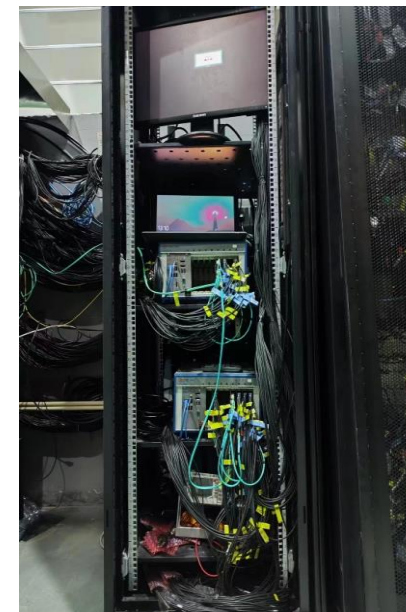

Actual implementation in KTX

Left images are our designed two kinds of mother cards with three kinds of dau-ghter cards used to **data acquisition, processing and aggregation.**

University of Science and Technology of China

The Software Platform of LabVIEW-FPGA-Based Real-time Processing System in Keda Torus eXperiment
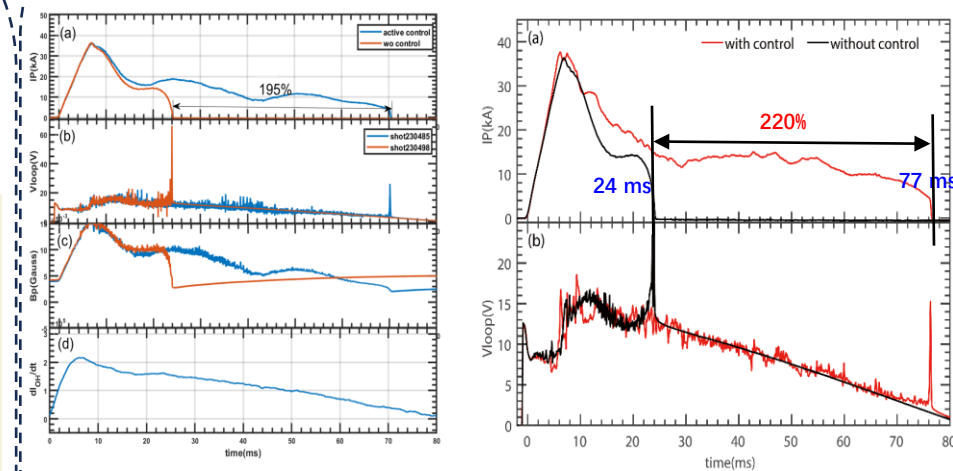
The schematic of software platform for KTX ACFES
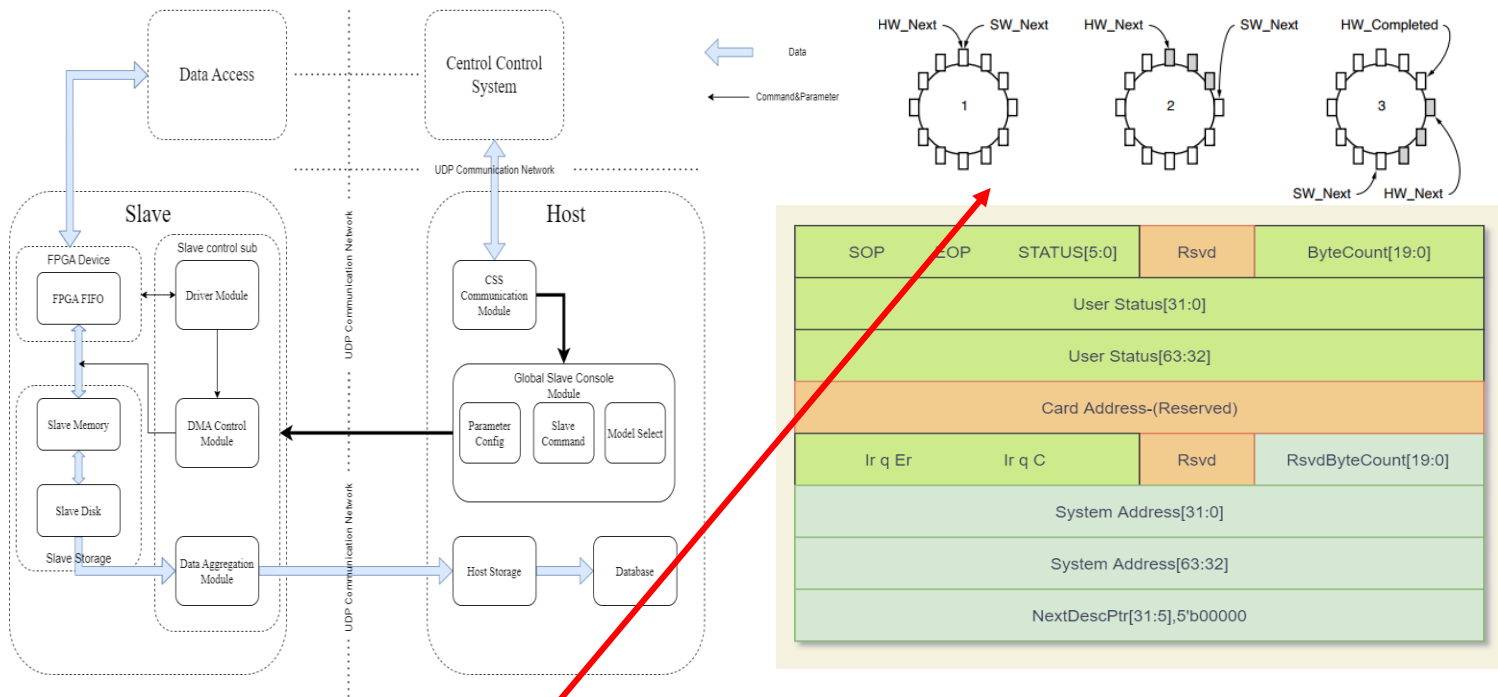
The core of software platform is the **DMA** transmission between hardware cards and memory, achieving uploading data and configuration at the same time.

It works as **a description ring**, which takes reference to the kintex-7 ug882 design guide.

Discharge experiment result

The discharge experiment results shows that active control remarkably extends the discharge time of KTX device by 220%.