PROGRESS OF THE CONTROL SYSTEMS FOR THE ADS INJECTOR II

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1 Introduction
The Chinese Academy of Sciences initiated an accelerator driven subcritical (ADS) program in 2011 under the frame of “Strategic Priority Research Program” for the objective of the safe disposal of nuclear waste as well as the potentials for advanced power generation. In an ADS system, the proton accelerator consists of two injectors, each for the energy of 25 MeV, and a main accelerator which is designed for the energy of 250 MeV and the current of 10 mA (Fig. 1). A demo facility for Injector II has been manufactured in the Institute of Modern Physics of Chinese Academy of Science.

2 The overall architecture of control system
Injector II in the China ADS system includes an ECR ion source, a low-energy beam transport line (LEBT), a radio frequency quadrupole accelerator (RFQ), a medium energy beam transport line (MEBT), 4 cryomodules and a diagnostics plate (Dplate).

Based on the Epics system architecture, a general three-layer control system (Fig. 2) is constructed for the ADS injector II.

3 The control system’s key devices includes:

- Fig. 4 Left: The ion sources control system based on PLC of Siemens S7 series 300.
- Fig. 4 Right: The MPS control system, the mainly control logic codes run on the dual redundant RFC460R 3TX controller. When the main PLC goes down, the backup PLC will work immediately in several ms.

- Fig. 5: The EVG (event generator) and EVR (event receiver) in timing system, which is provided by Shanghai institute of applied physics, Chinese Academy of Sciences.

4 The progress of the injector II control system
2014, where the subsystems, ECR+LEBT+RFQ+ MEBT + a testing cryomodule that consists of one superconducting cavity, are tested. Furthermore, the proton beam commissioning with the energy of 5.3 MeV has been finished in the control room in June 2015, where the subsystems, ECR+LEBT+RFQ+ MEBT + a cryomodule that consists of 6 superconducting cavities, are tested. The beam commissioning with the maximum energy of 25 MeV will be taken in the near future.