

Design, Fabrication and Assembly of EAST Passive Stabilizers Loop

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EAST, with full superconducting magnetic coils, has been designed and constructed to address the scientific and engineering issues under steady state operation. It has passive stabilizers with the function of protecting the vacuum vessel, heating systems and diagnostic components from the plasma particles and heat loads. [1] As the Vertical plasma motion is unstable in tokamak with elongated D-shape plasma, the passive stabilizers and in-vessel active feedback coils are used for vertical plasma position control in EAST. [2] To accommodate with the new stage for high performance plasma and enhance the control of vertical stabilization in EAST, the project of passive stabilizers loop (PSL) has been accomplished (Figure 1).

The PSL consists of 32 passive stabilizers and the current bridges. All the supporting structures of PSL are insulated from the vacuum vessel. The separate passive stabilizers are electrically connected together forming the upper and lower toroidal loops, and then the two loops are electrically connected by the copper current bridges. The current bridges are designed coaxial and symmetrical in order to counterpoise the electromagnetic forces. There are insulation layer and external resistor between the outer and inner bridges to avoid breakdown. What's more, a stainless steel shell with graphite tiles is covered on the bridges to protect them from the plasma (Figure 2). The total resistance of PSL is reduced to 150 micro ohms by silver plating on the contact surface.

As indicated, the PSL was fabricated and assembled successfully and met the design requirement for the plasma operation. With the PSL, the control of the vertical stabilization is improved.

Keywords: passive stabilizers loop (PSL), design, fabrication, assembly, current bridges

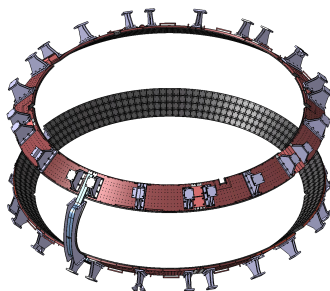


Figure 1: The structure of passive stabilizers loop.

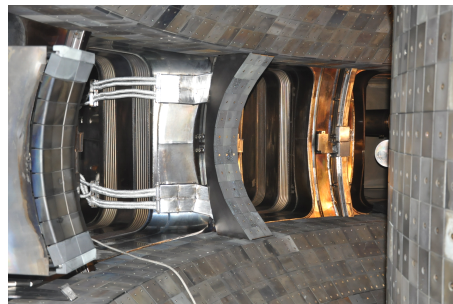


Figure 2: The current bridges of PSL.

[1] Y.T. Song, etc. Design, fabrication and assembly of EAST plasma facing components, APFA 2009, Japan, to be published in Plasma and Fusion Research.

[2] Shijun Du, etc. Fusion Engineering and Design. Vol81(2006)2267-2273