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## **Study on the adjustment capability of the excitation system located inside superconducting machine electromagnetic shield**

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The quick adjustment capability of the excitation system plays a very important role in maintaining the normal operation of superconducting machines and power systems, but the eddy currents in the electromagnetic shield of superconducting machines will hinder the exciting magnetic field change and weaken the adjustment capability of the excitation system. To analyze this problem, a finite element calculation model for the transient electromagnetic field with moving parts is established. The effects of different electromagnetic shields on the exciting magnetic field are analyzed using finite element method. The results show that the electromagnetic shield hinders the field changes significantly, the better its conductivity, the greater the effect on the superconducting machine excitation.

A 6-pole superconducting synchronous generator without electromagnetic shield and with three different electromagnetic shields was calculated using finite element model for the transient electromagnetic field with moving parts. By means of doubling and reversing the exciting coil terminal voltage, the exciting current in the exciting coil of the superconducting machine is changed. The changing process of the magnetic field, the eddy current inside electromagnetic shield and the terminal voltage of the A phase stator armature winding with the exciting current is obtained by calculation. The better conductive property of the electromagnetic shield can improve its shielding ability, but also reduce the excitation adjustment ability of superconducting synchronous machines.

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**Authors:** Prof. XIA, Dong (Institute of Electrical Engineering, Chinese Academy of Sciences); Mr XIA, Zheng

**Presenter:** Prof. XIA, Dong (Institute of Electrical Engineering, Chinese Academy of Sciences)

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