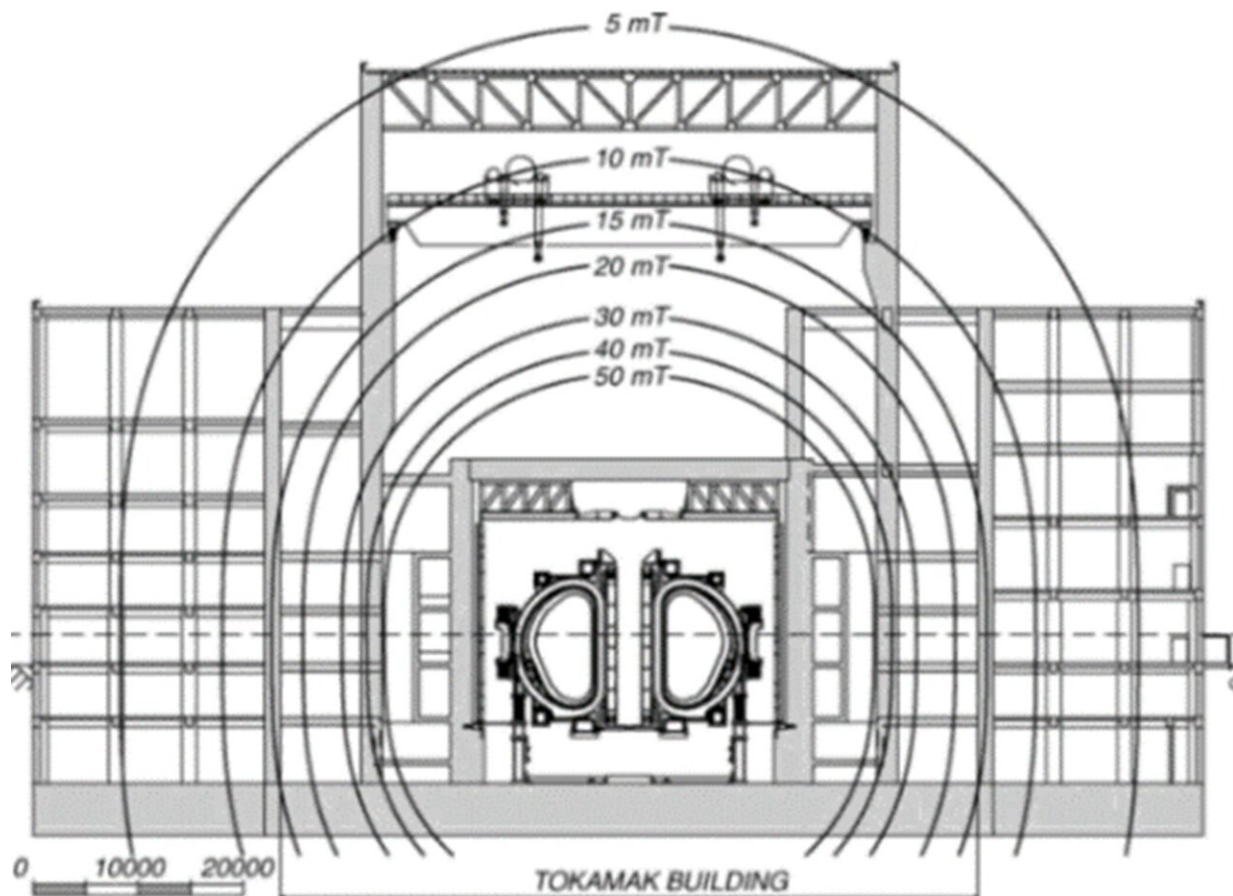


# Effective calculation method suggested for large-caliber magnetic field immunity testing

September 30 2022, by Zhang Nannan



Magnetic field distribution around Tokamak. Credit: HUANG Ya

With a reasonable and effective calculation method, physicists from the Hefei Institutes of Physical Science of the Chinese Academy of Sciences

have calculated the maximum allowable offset of simultaneous position and angle migration under the premise of many variables.

Results were revealed in *IEEE Transactions on Industrial Electronics*.

The research group was led by Prof. Gao Ge and Jiang Li. They studied the effect of coil offset on the performance of the large-caliber [magnetic field](#) immunity testing system for the International Thermonuclear Experimental Reactor (ITER).

The magnetic field around the Tokamak device plays an important role in the safe operation of magnetically sensitive equipment. Different intensities will affect the normal operation of devices and equipment. As one of the effective ways to solve the strong magnetic compatibility test, the large-caliber magnetic field immunity testing system has attracted much research attention. The test device is a magnetic field generation system composed of multiple coils. The coil offset during design and installation will change the magnetic field performance of the internal test area.

"We have built an experimental platform," said Huang Ya, first author of the study.

To investigate the relationship between coil offset and magnetic field performance, the researchers conducted an in-depth study on the 18 degrees of freedom offset of three groups of coils.

After studying the influence of single and multiple variables, they improved the calculation method from the law of magnetic field distribution data, and completed the fast calculation of the maximum allowable offset under multiple parameters. And the experimental results verified the correctness of the theoretical analysis.

The factors they studied included a large-diameter magnetic-field-withstanding test device, and errors caused by coil offset to the magnetic field uniformity.

They proposed a reasonable method to determine the allowable deviation of the equipment [coils](#).

Aside from that, they summarized a set of novel formulas. These formulas provide a theoretical basis for the actual installation.

**More information:** Ya Huang et al, An Improved Calculation Method of Coil Offset on the Large-Caliber Magnetic Field Immunity Testing System for ITER, *IEEE Transactions on Industrial Electronics* (2022). [DOI: 10.1109/TIE.2022.3206697](https://doi.org/10.1109/TIE.2022.3206697)

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