



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

Colloquium

Study on High power microwave window breakdown and electromagnetic undulator for FEL



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Conference Hall 104, Science Building, Tsinghua University

Abstract: The intense electromagnetic breakdowns in the high-power-microwave (HPM) transmission and radiation system, especially at the output window, seriously limit the HPM systematic power capacity, and become the bottle neck of the HPM technology-development and the international technical challenge. We have spent ten years on the theoretical and experimental researches of the intense electromagnetic breakdown mechanism under the nanosecond pulse and giga-watt power. We have proposed two kinds of methods to suppress multipactor and improve breakdown threshold, including periodic surface profiles and external resonant magnetic field. The two methods have been demonstrated by proof-of-principle HPM experiments to significantly improve the power capacity by 4 times. We have designed several high-capacity microwave devices to solve the power limitation of HPM transmission. We have also proposed new type of electromagnetic undulaor for high-gain free electron laser.

About the speaker: He has proposed two kinds of methods to suppress multipactor and improve breakdown threshold of high-power microwave window, including periodic surface profiles and external resonant magnetic field. The two methods have been demonstrated by proof-of-principle HPM experiments to significantly improve the power capacity by 4 times. He has co-proposed new type of electromagnetic undulaor for free electron laser, and designed several high-capacity microwave devices.

As the first and corresponding author, he has published 34 SCI papers in the international journals, including 2 x PRL, 6 x APL, PRE, APEX, OpEx, JAP, POP,LPB,PIER,RSI,IEEE MTT, IEEE TPS and so on; fifteen patents have been applied as the first inventor, and ten of them have been authorized. He is the program committee of several international conferences including 42th IEEE International Conference on Plasma Science, 16th IEEE International Vacuum Electron Conference and EMN meeting on Vacuum Electronics; he received the award of 2011 IEEE outstanding student in plasma science and technology (Unique winner at each year in the world). He won the highest special-grade scholarship and scholar new star of Tsinghua University in 2010.