Study of voltage limits on ion cyclotron antenna power in tokamaks*

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The limit on power-handling capabilities of ion cyclotron antennas is, when other restricting factors are eliminated, the voltage that the antenna or associated vacuum transmission line can withstand. While antennas can often achieve peak voltages in excess of 50 kV in vacuum, a reduction of 30% to 50% in their peak voltage capability is often seen in plasma conditions. The rf technology groups at ORNL and Max Planck Institute for Plasma Physics (Garching) have started a collaborative effort to understand the voltage breakdown limits in realistic conditions. High-voltage testers using well-defined geometry have been built at both institutions. Breakdown experiments in vacuum (with and without magnetic field) will be carried out this fall. Initial results will be discussed and plans for experiments on ASDEX Upgrade will be presented.

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