

Abstract Submitted
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First operation of a high-heat flux, flush mounted “rail” Langmuir probe array on Alcator C-Mod¹ ADAM Q. KUANG, DAN BRUNNER, BRIAN LABOMBARD, RICK LECCACORVI, RUI VIEIRA, MIT Plasma Science and Fusion Center — Divertor Langmuir probes are typically built proud of the divertor surface for an accurate measurement of the plasma flux. However, under the high heat flux conditions seen in Alcator C-Mod, proud tungsten probes that present a 10 degree attack angle to the incident heat flux can experience melt damage with less than 1 second plasma exposure time. A similar situation is anticipated for ITER. It is therefore desirable to develop a flush probe system that can both survive reactor-level fluxes and take accurate measurements. A poloidal array of 21 flush-mounted “rail” probes have been installed in the C-Mod outer divertor plate, which are toroidally-extended and field-aligned to minimize sheath expansion effects. Initial results indicate that the “rail” probes have a well-defined ion saturation current, reporting similar density and temperature measurements as proud probes. However, uncertainty in the projected area becomes significant when the incident magnetic field angle becomes less than ~ 0.5 degrees. Additionally, because the flush probes are conformal to the divertor surface, they are ideally suited to measure the poloidal distribution of halo currents during disruptions.

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