Exposures of Tungsten Nanostructures to Divertor Plasmas in DIII-D

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Abstract. Tungsten nanostructures (W-fuzz) prepared in the PISCES-A linear device have been found to survive direct exposure to divertor plasmas in DIII-D. W-fuzz was exposed in the lower divertor of DIII-D using the Divertor Material Evaluation System (DiMES). Two samples were exposed in lower single null (LSN) deuterium H-mode plasmas. The first sample was exposed in three discharges terminated by Vertical Displacement Event (VDE) disruptions, and the second in two discharges near the lowered X-point. More recently, three samples were exposed near the lower outer strike point in predominantly helium H-mode LSN plasmas. In all cases, the W-fuzz survived plasma exposure with little obvious damage except in the areas where unipolar arcing occurred. Arcing is effective in W-fuzz removal, and it appears that surfaces covered with W-fuzz can be more prone to arcing than smooth W surfaces.