MEASUREMENTS AND IMPLICATIONS OF Z_{eff} PROFILES ON THE DIII–D TOKAMAK

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ABSTRACT. Here $Z_{\rm eff}$ profiles have been obtained across the entire minor radius of the DIII–D[1,2] tokamak from measurements of visible bremsstrahlung continuum radiation. $Z_{\rm eff}$ profiles are presented for ohmic divertor and limiter plasmas and for neutral beam heated H–mode and L–mode plasmas. The measured $Z_{\rm eff}$ profiles are found to have small gradients over the entire plasma cross section. This implies that resistivity gradient driven electrostatic modes are unlikely to influence the confinement properties in the edge region of these discharges. The H–mode plasma has a centrally peaked $Z_{\rm eff}$ profile and a relatively flat electron density profile which suggests the existence of a negative value for the parameter η_i.