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8.22 Design Development of ITER Divertor Langmuir Probes

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The Divertor Langmuir Probes (DLP) on ITER will be used for machine control - helping to ascertain attached/detached plasma conditions – as well as for physics studies of the divertor plasma parameters. The severe environment of the divertor region, in particular the high photon radiation loads, presents a particular challenge to the probe design. The photon load averages several W/mmˆ2 on the plasma facing surfaces, and the total power can reach 20 W/mmˆ2 on the probe tip. The present design, evolved through several iterations, calls for a flush mounted probe assembly of tungsten and copper components brazed directly to the divertor target PFUs (plasma facing units) or “monoblocks”. Modeling indicates that this solution ensures reasonable temperatures for the passively cooled probes, often cooler than the divertor itself. Details of the present design and thermo-mechanical analysis will be presented, along with the expected system performance. The views and opinions expressed herein do not necessarily reflect those of the ITER Organization.

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