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Measuring density in the ITER fusion plasma

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The operation of ITER requires high-quality estimates of the plasma density over multiple regions in the plasma for plasma evaluation, plasma control and machine protection purposes. Although the density regimes of ITER are not very different from those of existing tokamaks (10^18 –10^21 m^-3), the severe conditions of the fusion plasma environment present particular challenges to implementing these density diagnostics. An overview will be presented of the array of ITER density diagnostics designed to measure over the entire ITER regime: plasma core, pedestal, edge, scrape-off layer and divertor. It will focus on the challenges faced in making these measurements, and the technical solutions of the current designs.

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