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Profile modifications by magnetic islands in the H-1NF plasma¹

SANTHOSH T. A. KUMAR, BOYD D. BLACKWELL, MICHAEL G. SHATS, Australian National University, JEFFREY H. HARRIS, Oak Ridge National Laboratory — Magnetic islands in fusion devices have serious impacts on plasma confinement. Islands can in general degrade the confinement by mixing up different regions of the plasma. However there has been experimental evidence of confinement improvement by transport barriers induced by the formation of islands, under favourable conditions. Detailed behaviour of magnetic islands is not fully understood, experimentally. Magnetic islands in the H-1NF heliac have recently been exploited to study this issue in detail. Accurate mapping of vacuum magnetic islands has been carried out using wire tomography. A Langmuir probe has been used to obtain the temporal and spatial profiles of local plasma parameters. Our experimental results indicate that under some conditions, magnetic islands serve as pockets of improved confinement regions in the plasma. This results in significant profile modifications including excitation of large radial electric fields in the range of 5kV/m. Experimental results are discussed.

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