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TCV and Negative Triangularity Experiments

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The Tokamak a Configuration Variable (TCV) was designed with the specific goal of studying the effect of plasma shape on the confinement of energy and particles in toroidal magnetised plasma. Extensive use has been made of the plasma shaping capability of TCV and of its versatile electron cyclotron heating and current drive system to study tokamak plasma with extreme shaping and over a large range of collisionality. Extensive research has been done to examine the stability and confinement properties of plasma with negative triangularity. Studies have been performed in ohmic, L-mode and H-mode discharges [1, 2, 3, 4]. Energy confinement, stability and the effect of triangularity on MHD modes have been made with accompanying theoretical analysis. A significant improvement of the energy confinement time is observed in negative triangularity discharges in comparison to positive triangularity discharges of the same collisionality. More recently a comparative study of the turbulence properties of plasmas with positive and negative triangularity have been performed [5, 6, 7]. The turbulence measurements show a strong reduction in the integrated amplitude and spectral width of turbulence in negative triangularity discharges compared to discharges of positive triangularity; this observation is coherent with the improvement in energy confinement time. The reduction in turbulence is observed not only at the plasma edge but also in the core. This talk will describe the results of this work in some detail. Plans for future work will also be presented.

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