

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Upgrades for the TCV tokamak BASIL DUVAL, EPFL/CRPP Lausanne CH, TCV TEAM — Major upgrades are being implemented on the TCV tokamak to extend its operational domain towards a burning plasma regime. The goals of obtaining high normalized plasma beta and comparable ion and electron temperatures will be achieved with the addition of a 1MW neutral heating system and 2MW additional third harmonic EC power. Spatial constraints together with beam occlusion required severe design optimization and the additional of a new large tangential port on the TCV vessel. For EC, the existing vertical launch mirror will be sufficient but new 1MW EC units will be employed with the legacy X3 systems modified for lateral launch. The modifications will not affect TCV's strong RT shaping and EC actuator ranges or the open divertor vacuum chamber that permits access to Snowflake divertor or doublet configurations although some wall protection enhancement is envisaged. TCV can then contribute to disentangling effects of electron-ion coupling, rotation, current and density profile control all as a function of shape in L and H-modes with ITER (or higher) values of plasma beta. Together with fast-ion physics, TCV will also be able to explore heat, particle and momentum transport and turbulence effects in electron-heat dominated discharges for Te/Ti in the (0.02 to 3) range.

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Date submitted: 12 Jul 2013

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