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【213】Enhanced plasma shape and vertical stability control in TCV

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Plasma shaping in tokamaks, influencing energy confinement and plasma stability, is of paramount importance for the design of future fusion reactors for energy production. An improved controller for the plasma vertical instability is developed and integrated on the TCV digital control system. For its design a simplified control oriented tokamak model and loop shaping techniques are applied in a Matlab-Simulink environment. A decoupling scheme for shape and position control is also studied, ensuring the separation of their different characteristic time scales. This novel approach, implemented within the existing architecture, will allow real time control of advanced plasma configurations (e.g.,negative triangularity in H-mode and exact snowflake) on TCV.

Author: Mr PESAMOSCA, Federico (SPC - EPFL)

Co-authors: Dr ANAND, Himank (ITER Organisation); Dr CODA, Stefano (SPC - EPFL); Dr FELICI, Federico (Technische Universiteit Eindhoven)

Presenter: Mr PESAMOSCA, Federico (SPC - EPFL)

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