

WPW7X in Horizon Europe

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Mission 8: bring stellarators to maturity



Donné, Morris: European Research Roadmap to the Realisation of Fusion Energy FP9 Fusion Power Plants Short-term Medium-term Long-term ITER Research on First plasma **Full performance** present and planned facilities, analysis and Commence **Electricity** production modelling concept construction EMO acilities IFMIF/DONES Material research Mission 8 **Stellarator as fusion plant?** Lower cost through concept improvements and innovations



Synergistic benefits for the Roadmap: strategic risk mitigation, innovation, specific support to ITER and DEMO + 3D-expertise

Prospects of stellarators as an alternative line to fusion electricity

How needs a next-step-stellarator-device look like?



Programmatic elements of W7-X in Horizon Europe

HELIAS reactor relevant plasmas

- high-performance/long pulse
- high density and $T_i \sim T_e$,
- high beta (**n**T), low v*

fast-ion generati

aive tor ept (&more?)

theory driven exploitation: understanding for predictions he 3D turbulence burning plasmas and stellarator optimization of the stellarator optimization opt mon dependencies mization & FPP physics basis

- fully-cooled divertor
- ECH/ICH/NBI upgrades
- cw pellet fuelling
- SSO (30 min) & technology

Wall OP



Key players in Mission 8



