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Power exhaust in all geometric variations of the snowflake divertor on TCV WOUTER VIJVERS, GUSTAVO CANAL, BASIL DUVAL, BENOIT LABIT, HOLGER REIMERDES, STEFANO CODA, CRPP - EPFL, Association EURATOM-Confederation Suisse, TILMANN LUNT, Max-Planck-Institut fur Plasmaphysik, EURATOM Association, THOMAS MORGAN, GREG DE TEMMERMAN, FOM Institute DIFFER, Association EURATOM-FOM — The snowflake (SF) divertor is recognized as a potential exhaust solution for large-scale, high-performance tokamaks. TCV has advanced to a detailed study of the transport through the SF's scrape-off layer (SOL), null region and divertor legs to determine the optimal geometry and quantify parallel and cross-field transport. Experimental SF plasmas have two closely spaced x-points, leading to two additional strike points (SPs) and a larger region of low poloidal field than in a conventional divertor. The relative x-point positions determine the divertor geometry and hence the exhaust properties. The results show that if parallel transport is dominant, either the HFS or LFS SOL power can be distributed to two SPs, with the power ratio depending on the SOL width, inter-x-point distance (D) and geometrical divertor asymmetry. Cross-field transport allows power to reach SPs in the private flux region. Experiments show significant power reaching such SPs already at large D, particularly during ELMs, enabling a 2-3x reduction in flux to the main SPs. As EMC3-Eirene simulations predict much smaller SP powers, additional transport mechanisms beyond perpendicular diffusion are considered. The SF's beneficial magnetic properties are shown to be enhanced in reactor-size devices.

Wouter Vijvers
CRPP - EPFL, Association EURATOM-Confederation Suisse

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