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Alternative power exhaust studies in an advanced upper divertor in ASDEX Upgrade supported by SOLPS and EMC3-EIRENE simulations TILMANN LUNT, OU PAN, ALBRECHT HERRMANN, DAVID COSTER, MIKE DUNNE, YUEHE FENG, ARNE KALLENBACH, MARCO WISCHMEIER, HARTMUT ZOHM, Max Planck Institute for Plasma Physics, ASDEX UPGRADE TEAM — In order to study alternative divertor configurations, currently discussed as a possible solution for the power exhaust problem in a fusion reactor, the installation of a pair of in-vessel poloidal field coils in the upper divertor of ASDEX Upgrade was recently decided. Besides the conventional single- and double null configurations, a series of new configurations ranging from an X- divertor, to a low- (LFS SF^-) and finally a high field side snowflake minus will be possible with these coils in a machine with a high P/R ratio. The arangement of these coils was based on the pioneering work of TCV as well as simulations with EMC3-EIRENE, which can rather easily handle topologies with two X-points and which identified a series of heat flux mitigation effects. Due to the lack of drifts and volumetric recombination in the code, however, a clear prediction on the detachment degree and threshold is missing as well as a realistic description of the in-out divertor asymmetries. This limit has now been overcome by creating an adequate computational grid for a LFS SF^- configuration for SOLPS. In this contribution we will present the worldwide first simulation on this grid as well as the upgrade plans and discuss the potential different heat flux mitigation mechanisms.

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