**High-heat-flux components for a DEMO reactor: materials, design and performance**

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Development of a reliable high-heat-flux (HHF) technology is one of the crucial requirements of the power exhaust strategy for a power plant scale fusion reactor such as DEMO. Assuring thermal resilience and robust structural integrity under all operational scenarios including off-normal/accidental transient events is an essential prerequisite for the validation of design concept and technologies of the HHF components such as Divertor target and Limiter plasma-facing components. To understand the dynamic interplay between the loads, materials and design concept is the key step towards the metallurgical and mechanical engineering of the HHF components. A major challenge here is the extremely harsh loading environment characterised by severity, complexity, coupled multiphysics nature and uncertainty. Another serious challenge is to meet the stringent DEMO-specific design requirements such as reduced activation and irradiation-resistance of the structural materials. As high-level constrains, these challenges drive the entire design study and technology R&D posing a fundamental impact on the materials technology for the HHF applications. Therefore, a sound understanding and up-to-date knowledge in this context should be deemed indispensable for engineering industrially feasible HHF components for a DEMO and beyond. The aim of this tutorial lecture is to give an overview on this topic and essential lessons leant from the previous design/R&D efforts to the entry level engineers and scientists working in the related fields. Focus will be placed on the sacrificial armour (tungsten) and heat sink (copper alloy) materials presenting the findings from the extensive HHF testing campaign and comprehensive mechanics modelling studies.