



**University of
Sheffield**

Speaker 1

Exploration of using ferrous alloys as radiation damage resistant materials for fusion



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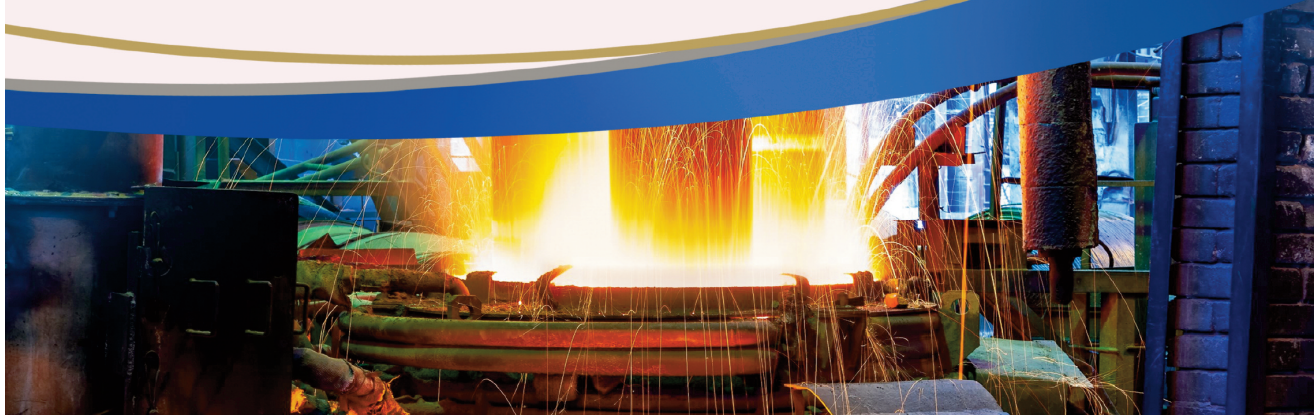
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ABSTRACT:

Fusion energy offers great potential for zero carbon power, but poses severe challenges for materials. This work explores the effects of the life-limiting factors on breeder blanket structural materials and aims to expand the operational window of current steel options. Existing literature shows manganese contributes to irradiation induced degradation and enhances clustering effects in fusion steels, which will result in embrittlement upon the cool-down of a reactor. To further this knowledge, Fe-based model alloys, with varying levels of Mn, have been subjected to stimulant reactor irradiation, and the effects on the formation of clusters analysed. Due to their atomistic scale, TEM and APT will be used to determine the formation, location and size of the clusters, particularly their vicinity to irradiation induced defects and dislocation loops. Verification of critical content of Mn will then allow development into industrially applicable materials and set significant boundaries on the composition of fusion steels.



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