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Fusion Codes & Standards: Current Challenges and Future Directions

The development of fusion energy requires robust, harmonised Codes and Standards (C&S) to ensure safety, reliability, and regulatory acceptance. Kyoto Fusioneering (KF) has extensive experience applying ASME, JSME, RCC-MRx, and CSA frameworks to real projects, including hydrogen isotope permeation sensors (TRI-PRISM) and the UNITY-2 tritium facility. KF actively contributes to shaping future standards through participation in ASME BPVC Section III Division 4 and ISO initiatives via BSI, providing technical input and data from advanced blanket and fuel cycle systems.

Despite progress, significant gaps remain: qualification pathways for high-temperature and reduced-activation materials (e.g., SiCf/SiC, vanadium alloys, RAFM steels) and the absence of fusion-specific acceptance criteria for tritium permeation barrier coatings. Addressing these challenges requires international collaboration, experimental validation, and pragmatic approaches that avoid overly restrictive requirements at this early stage. KF advocates for ASME to lead global harmonisation efforts, supported by evidence-based processes, to enable safe, efficient, and timely deployment of fusion technologies worldwide.

Technical Categories Addressed

Other Systems

Speaker's title

Mr

Speaker's email address

l.candido@kyotofusioneering.com

Country/Int. organization

United Kingdom of Great Britain and Northern Ireland

Affiliation/Organization

Kyoto Fusioneering UK Ltd

Author: CANDIDO, Luigi (Kyoto Fusioneering Ltd)

Presenter: CANDIDO, Luigi (Kyoto Fusioneering Ltd)

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