

Fusion Energy Development Applications Utilizing the Spherical Tokamak and Associated Research Needs and Tools

Monday, 22 October 2018 14:00 (4h 45m)

The spectrum of scientific and technological gaps that must be closed to achieve practical fusion energy using magnetically confined plasmas has been extensively documented. A common barrier to narrowing or closing these gaps is the scale and cost of fusion facilities needed to address the gaps. The low-aspect-ratio “spherical torus/tokamak” (ST) is being explored world-wide as a potentially attractive configuration for closing scientific gaps and demonstrating technical achievements on a path toward a demonstration power plant and as a more compact and/or modular fusion power source in its own right. The international fusion community is presently assessing the suitability of the ST for applications to advance fusion energy development including: developing solutions for the plasma-material-interface (PMI) challenge, fusion-fission hybrid systems, developing fusion components capable of withstanding high fusion neutron flux and fluence including breeding blankets, demonstrating electricity break-even from a pure fusion system, and electricity production at industrial levels in modular and/or larger-scale fusion power plants. This range of fusion energy development applications utilizing the ST will be described, common application-driven research needs discussed, upcoming and recently achieved ST facility capabilities and relevant highlights described, and near-term prioritized ST research directions supporting longer-term fusion energy development applications presented.

Country or International Organization

United States of America

Paper Number

OV/P-6

Primary author: Dr MENARD, Jonathan (Princeton Plasma Physics Laboratory)

Co-authors: Dr LLOYD, Brian (Culham Center for Fusion Energy); Prof. LIPSCHULTZ, Bruce (University of York); Dr KINGHAM, David (Tokamak Energy Ltd); Dr ALLADIO, Franco (ENEA, Istituto Confucio, Università la Sapienza, Rome, Italy); Prof. WILSON, Howard (University of York); Dr HARRISON, James (CCFE); Prof. HANADA, Kazuaki (Advanced Fusion Research Center, Research Institute for Applied Mechanics, Kyushu University); Dr ONO, Masayuki (PPPL/Princeton University); Dr REINKE, Matthew (Oak Ridge National Laboratory); Prof. GRYAZNEVICH, Mikhail (Tokamak Energy Ltd); Mr BAKHAREV, Nikolai (Ioffe Institute); Prof. FONCK, Raymond (University of Wisconsin-Madison); MAJESKI, Richard (Princeton Plasma Physics Lab); Dr GUSEV, Vasily (Ioffe Physical-Technical Institute); Prof. ONO, Yasushi (University of Tokyo); Prof. HWANG, Yong-Seok (Seoul National University); Prof. TAKASE, Yuichi (University of Tokyo); Prof. GAO, Zhe (Tsinghua University)

Presenter: Dr MENARD, Jonathan (Princeton Plasma Physics Laboratory)

Session Classification: OV/P P1-P8 Overview Posters

Track Classification: OV - Overviews