
ARIES-ST Special Issue Editorial

Theoretical studies indicate that the performance of a tokamak plasma is substantially improved with decreasing aspect ratio. In addition, low aspect ratio (<2) tokamaks have unique physics features such as large natural elongation and strong magnetic field pitch. These devices are referred to as Spherical Torus or Spherical Tokamaks (ST). The plasma beta in a ST device can be high enough and the required toroidal field can be small enough such that resistive toroidal-field coils with manageable Joule losses can be used. This eliminates the need for a thick, inboard shield for cryogenic toroidal-field coils so that fusion devices with smaller major radius are possible. Recent experimental results have been quite encouraging and generated substantial interest in the ST concept.

This special issue is the results of a 2.5 years study of the physics, engineering, and systems

aspects of a 1000 MWe commercial power plant based on spherical torus concept. These papers provide a basis to assess potential of the ST concept as a fusion power plant and identify key R&D issues.

The ARIES Team consists of scientists from US national laboratories, universities, and industry with strong international collaborations. All papers presented in this special issue benefit from contributions made by all scientists in the ARIES Team, who are acknowledged in the first article by F. Najmabadi.

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