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Overview of simulation results using computation resources in the framework of IFERC-CSC

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Following the successful operation of a European High Performance Computer For Fusion applications (HPC-FF) in Jülich, Germany, from 2009 to 2013, a new supercomputer dedicated to magnetic fusion research was procured within the Broader Approach agreement between Europe and Japan. The new platform, “Helios”, was installed in the International Fusion Energy Research Centre - Computational Simulation Centre (IFERC-CSC) in Rokkasho, Japan and it started operations in January 2012 and is expected to serve until the end of 2016. The use of the Helios computer has been rather successful with a large scientific output expressed in the number of peer-reviewed publications of around 1 per project per year. In the 5th Cycle of operation of Helios, over 120 projects have been selected, corresponding to over 300 users. In this paper, the main scientific and technical results obtained in the Helios numerical simulations projects are described with emphasis on the impact in developing fusion science and related technologies. At the end of its life cycle the use of Helios will be replaced in Europe with a new EUROfusion supercomputer, allowing further development of fusion technologies based on computer modelling and simulations. Collaborations between Japan and Europe will continue with new opportunities for joint projects like Helios.

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