

Status and perspectives of controlled thermonuclear fusion research

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Thermonuclear fusion is encountering a renewed interest in the global scientific community as well as in the public opinion due also to the increasing need of low carbon energy production in the coming decades. In the last year, various achievements have been announced, the most noticeable being the Deuterium-Tritium campaign at the JET tokamak under the coordination of the EUROfusion Consortium. The recent JET results – 59 MJ of fusion energy in 5 s – represent a landmark in the European Research Roadmap to the Realization of Fusion Energy, the record being obtained in a way relevant to ITER and future fusion devices. The next major step will be the demonstration of the scientific and technological feasibility of fusion in ITER, that is expected to produce net energy for long period. The design of a demonstration power plant DEMO is already in progress together with a strong research and innovation programme. Accompanying activities are carried on in Europe and worldwide on smaller devices to address the science and technology challenges for realization of fusion energy. The Italian scientific community is deeply involved in fusion research since many decades. A new facility has been designed, the Divertor Tokamak Test – DTT, which is under construction in Frascati with the goal to contribute to one of the main fusion challenges in support to DEMO, the power exhaust.