

**The 2005/2006 report of the
EURATOM/UKAEA Fusion Association**

Preface

Fusion, the energy source that powers the Sun and the stars, could provide a new and almost limitless source of energy for power generation here on Earth. In a world in desperate need of new, clean and large scale sources of energy, fusion would seem to be part of the long term options. With the initialling of the international agreement in May 2006, to build ITER (the International Tokamak Experimental Reactor) in Cadarache, France, commercial fusion power is moving a big step closer to reality. ITER is designed to increase the understanding of fusion physics and to test the technologies that will be essential for the development of commercial fusion power plants.

Culham is perhaps the world's leading fusion laboratory. The fusion activities at UKAEA's Culham site are making key contributions to the development of fusion and especially to ITER. UKAEA operates the Joint European Torus (JET) facility for experiments by teams of scientists from all the EURATOM partners. Culham is also the headquarters for the strong UK Fusion programme, which centres on MAST (the Mega Amp Spherical Tokamak). MAST represents an innovative and promising concept for fusion power in its own right. Research carried out on MAST also makes important scientific contributions to ITER.

The UK Fusion programme at Culham is part of a Europe wide programme coordinated via EURATOM through Associations – including the EURATOM/UKAEA Association. The programme is jointly funded by the UK Engineering and Physical Sciences Research Council (EPSRC) and EURATOM. Recently the programme received additional UK funding to support work that will contribute to the development of instrumentation and heating equipment for ITER.

This report summarises the wide range of activities related to fusion research undertaken at Culham during 2005/06. Chapters 2 to 9 include a conventional account of the year's activities, and provide more detailed information about fusion as well as technical highlights of the research we've undertaken. Chapters 10 and 11 contain a list of our publications and a glossary of the terms used in this report.

In the first chapter we've broken with tradition, and asked the researchers themselves to work with a science writer to give a flavour of the research they are carrying out to make fusion a reality. Decorated with specially commissioned photographs along with artwork and haiku poems produced by Culham staff during workshops run by our artist in residence, Jane Corbett, these pages aim to illustrate the creative approach we take in our research and the enthusiasm we at Culham feel about working towards the goal of making fusion power a viable source of energy for the future.



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