EDITORIAL

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Guest Editor

Energetic alpha particle physics plays an obviously crucial role in burning fusion plasmas. Good confinement of them is required to sustain fusion burn and to avoid damage of the first wall. Because of this importance for nuclear fusion research, Y. Kolesnichenko and the late D. Sigmar initiated a series of IAEA technical (committee) meetings (TCM, since the 8th meeting TM) in order to exchange information on the behaviour of energetic particles in magnetic confinement devices. The role of the TMs has become increasingly important since burning plasma projects such as ITER are in preparation. After every TM, invited speakers are encouraged to publish an adapted and extended version of their contributions to the meeting as an article in a special issue of *Nuclear Fusion*. An exception was the 8th TM the articles of which were published in a special issue of *Plasma Physics and Controlled Fusion* (2004 **46** S1–118). These special issues attract much interest in the subject.

The 9th IAEA TM of this series was held in Takayama, Japan, 9–11 November 2005, and 53 papers including 16 invited talks were presented. A total of 11 papers based on these invited talks are included in this special issue of *Nuclear Fusion* and are preceded by a conference summary. Experimental results of energetic ion driven global instabilities such as Alfvén eigenmodes (AEs), energetic particle modes (EPMs) and fishbone instabilities were presented from several tokamaks (JET, JT-60U, DIII-D and ASDEX Upgrade), helical/stellarator devices (LHD and CHS) and spherical tori (NSTX and MAST). Experimental studies from JET and T-10 tokamaks on the interaction of ion cyclotron waves with energetic ions and runaway electrons were also presented. Theoretical works on AEs, EPMs and nonlinear phenomena induced by energetic particles were presented and compared with experimental data. Extensive numerical codes have been developed and applied to obtain predictions of energetic particle behaviour in future ITER plasmas as well as a tool for design study of future machines. The trend in theoretical code work is to become self-consistent and integrated with a suite of predictive codes. The development of various diagnostics for energetic particle measurements was the subject of many presentations, in particular for burning plasma experiments such as ITER.