

COMMENTS



These next two issues of *Fusion Technology* (*FT*) are devoted to the topic of alpha-particle effects in fusion plasmas. The papers contained in these issues were written by participants in the International Atomic Energy Agency (IAEA) international workshop on this topic, held in Kiev, USSR, October 23–26, 1989. The *FT* staff is extremely pleased to have this extensive coverage of this most important topic. It is especially timely now, as we approach the period where experimental studies of alpha-particle effects are close to reality. Such studies may be carried out soon in deuterium-tritium experiments in the Joint

European Torus, and later in special devices such as the proposed Compact Ignition Experiment. Indeed, the alpha-particle effects represent the “new physics” that will be encountered in the long-burn operation of the proposed International Thermonuclear Experimental Reactor.

There are many “effects” that may be associated with alpha particles in a burning fusion plasma. In the ideal case, the alpha particles would be born at $3\frac{1}{2}$ MeV and deposit this energy while they slow down, maintaining ignition and/or heating of the plasma. Then, we hope, they are quickly swept out as thermalized alpha particles. This is important to prevent buildup of so-called “ash” that might quench the burn.

There are a number of deviations from this idealized behavior, both good and bad, that have been considered by various researchers. These include such things as alpha-particle-induced instabilities in the background, instabilities that cause the alpha particles themselves to escape rapidly before thermalization, the excessive buildup of helium ash that quenches the fusion burn, bombardment of the vessel walls by escaping alphas to produce blistering, etc. A variety of these topics are discussed in the papers contained in these two issues.

We are indebted to Dr. Kolesnichenko, who served as the IAEA workshop coordinator and who also helped organize these papers. The proceedings of the workshop itself will appear through the normal IAEA publication series. However, attendees were invited to prepare full papers based on their presentations at the workshop for submission to *FT*. As is seen from the papers here, a large number of attendees chose this option. We are quite pleased with this response, since it makes possible the broad coverage this topic deserves. Thanks are also due to Dr. Dieter Sigmar, who attended and helped coordinate the U.S. presentations at the workshop. Dr. Sigmar was instrumental in aiding with the paper arrangements. Finally, the cooperation of the IAEA staff is gratefully acknowledged.

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