

Abstract Submitted
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Kinetic simulation of burning plasmas GIOVANNI LAPENTA, LANL

— Burning plasmas pose new challenges to the fusion theory community. The presence of hot alpha particles generated by fusion reactions introduces new scales and new processes not important in conventional plasmas. Particularly challenging is the fact that the gyroradius of alpha particles can become significant and require a more careful analysis. For example, in ITER the regular ions at 10keV will have a gyroradius of the order of a tenth of a centimeter, but the alpha particles generated at 3.5MeV will have a gyroradius of 10cm. This scale is no longer small compared to many important processes developing in a fusion device (e.g. neoclassical tearing islands). Therefore many of the approximations we are accustomed to, will no longer be accurate. We present here an approach that is ideally suited to study alpha particles in burning plasmas: the implicit moment kinetic particle in cell method implemented in the code CELESTE. We discuss the method and its application to burning plasmas.

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