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Plasma self-organization by maximum entropy production Y.-B. KIM, Enig Associates, Inc., USA — Understanding turbulence saturation mechanism in magnetically confined plasma is one of the most important but unsolved problems in plasma physics research. The following hypothesis has been proposed as a possible turbulence saturation mechanism in confined plasma. The confined system filled with plasma, turbulent electromagnetic field and trace amount of neutral particles, e.g., magnetically confined thermonuclear system, will approach to the state of global maximum entry production. This hypothesis determines unique equilibrium plasma profiles without knowing detailed underlying turbulence dynamics in certain cases. This approach is different from the conventional picture of transport; in which source is balanced by linear thermodynamic forces and then transport coefficients are determined from either microscopic theory or experiment. The definition and evolution of entropy in this complex system is introduced and global entropy production rate is maximized under the constraint of particle, momentum, and energy conservation. Results from analytical and numerical calculus of variation will be discussed.

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