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OPERATION AND CONTROL OF HIGH DENSITY TOKAMAK REACTORS*

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I. INTRODUCTION

The power density produced in a reactor plasma depends on the density and temperature of the fuel ions burned. In the case of a deuterium-tritium fueled system, this quantity is given by $N_D N_T \langle\sigma v\rangle Q_F$. Tokamak reactors will have to operate under ignition conditions to attain economic viability. This requirement imposes parametric constraints on the containment system since ignition depends on density, temperature, and energy confinement time. The energy confinement time in turn depends on other variables but at present this dependence is not known. There are indications, however, that confinement time will scale favorably with an increase in density. This result is suggested both by experiments and theoretical analyses. Thus there are incentives from several points of view to operate the reactor plasma at high density.

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