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**Advances in the IGNITOR Plasma Control\*** F. VIL-  
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LETTI, A. CUCCHIARO, ENEA, Italy, B. COPPI, MIT — The IGN-  
ITOR vertical position and shape controller has been designed on the  
basis of the CREATE\_L linearized plasma response model, taking into  
account the engineering constraints of the machine and the features of  
the burning plasma regimes to be obtained. Special care has been de-  
voted to the design of a robust control system, that can operate even  
when a degradation of the performance of the electro-magnetic diag-  
nostics may occur. The coupling between the vertical position control  
and the plasma shape control has been analyzed, in order to allow the  
plasma vertical position to be stabilized also in the case where a shape  
disturbance is provoked by a change of the main plasma parameters.  
Simulations of the control system response have been carried out using  
realistic models of the electrical power supply system. The non-linear  
computation of equilibrium flux maps before and after the perturbation  
shows that the system is able to recover from all the assumed distur-  
bances with this control scheme. In addition, the control of the plasma  
current and of the separatrix of the double-null plasma configuration is  
being studied.

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