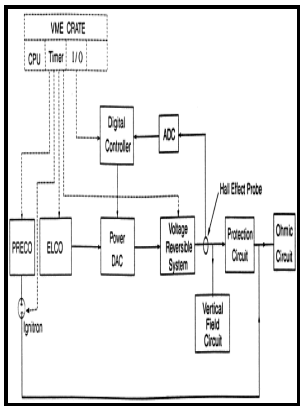
Alternating current tokamak reactor with Ohmic ignition and bootstrap current

University of Saskatchewan, Plasma Physics Laboratory - Tokamak



Description: -
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Research Programs

The current and size of the field coils 12, 5 and 6 are designed to provide equal degrees of radial and axial compression to the spheromak, which is feasible as long as compression ratios are in the range of 3, or about 3 or less. The success of the T-1 resulted in its recognition as the first working tokamak. History US turmoil One of the people attending the Novosibirsk meeting in 1968 was Amasa Stone Bishop, one of the leaders of the US fusion program.

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When the problem is considered even more closely, the need for a vertical parallel to the axis of rotation component of the magnetic field arises.

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Winston Bostick, The Pinch Effect Revisited, Int. This paper examines and offers some solutions to the critical issues related to a reactor, which include: development of a physics understanding of the approach to and control of ignition; choice of continuous or semi-continuous long pulse operation; development of a fully coherent and robust divertor for power exhaust and impurity control; minimisation of the effect of plasma disruptions; development of advanced materials and components needed for a reactor first wall and blanket, mechanical structure and superconducting coils; and development of technology for fast and reliable remote maintenance. L , it is possible to select the moment of ignition of the discharge dg.

Conceptual design of a poloidal field coil system and operation scenario for an inductively operated day

Since the capacitor 14 and the distribution bus 18 are directly connected to each other, the distributed capacitance of the distribution bus 18 also functions as a charge storage means and thus there need not be any physical separation between the distribution bus 18 and the capacitor 14. The vacuum is sealed by mating the coil form 19 to the vacuum vessel 23, for example, with an electrically isolating seal 24 comprising one or more high temperature insulating gaskets made of suitable material e.

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Coaxial initiator electrodes 150 surrounded by insulator bars 152 are shown inserted into coaxial holes in the conductor plates for the purpose of initiating breakdown of the dielectric gas in the spark gap switches 146 by injecting a plasma discharge through radial holes 153 in the insulator bars 152 and the conductor plates 114x , 114y , 112x , 112y. Lithium 6 is choosen because it is subject to fission into tritium and helium if it is hit by a fast neutron. The distribution bus 18 preferably has spherical or cylindrical symmetry about the focus point 26 rather than the cubic symmetry of FIG.

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Another electrical power supply for the GlidArc was proposed in a Polish patent PL301S36A1 1994 by T. The electrical power dissipated in the central electrode 2 can be calculated according to the following formula: P~ ~ bn U~I + ApI a , 6 I - electric current of GlidArc through one electrode, in Amperes; UC - cathodic potential drop of discharge plasma, in Volts, given by the plasma-forming gas and the electrode material used; - specific resistance of electrode material in Sam; A - geometric factor of electrode in m 1; n - number of primary electrodes and phases feeding them ; b - factor representing the fraction of the life cycle ignition - primary unstable discharge -extinction - reignition of the GlidArc during which the electrical current runs through the ignition electrode. A tokamak reactor operating semi-continuously would be simpler in construction, use re-circulating power more efficiently and would likely be more reliable in operation.

ⓘ Tokamak. A tokamak is a device which uses a powerful magneti

The two primary electrodes 1 are fed by a main alternating current generator Ap.

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Models remain to have limited predictable capability since they are unable to model the H-mode barrier properly, and one therefore needs to assume a boundary conditions at 80 or 90% of the plasma radius. The capacitor plates 29 and 31 discharge, in oscillatory form, via the electrodes 5 and 7 and the high-resistivity channel 9.

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