

A partitioned stator hybrid excited machine is proposed, in which the permanent magnets and field windings are alternately placed on an inner stator separated from the outer stator having armature windings. This machine inherits the features of brushless machines and benefits from better space utilization. The operating principle and the effects of slot/pole combinations are investigated in detail. Further, based on 2-D finite-element analysis, the electromagnetic performances of the proposed machines, including back-electromotive force, cogging torque, flux regulation range, torque capability, power factor and torque-speed curve, are evaluated. The results reveal that the proposed machines can exhibit wide flux regulation range as well as good torque density. The prototype is manufactured and tested to validate the predictions.