

Simulations of High efficiency Klystron

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In the application on the contemporary large particle colliders, increasing the efficiency of Klystron indicates substantial decrease of the operating cost, especially in a long run. There are lots of methods and concepts to increase the Klystron efficiency, which consistently engage to collect the peripheral electrons in the bunching process to achieve a very deep modulation at the entrance of the output cavity. To make a more compact high efficiency Klystron operating in L band, with MW output power, a new method called CSM(core stabilization method) employs a set of high order harmonic cavities to focus the beam longitudinally. As a demonstration, single beam Klystron based on CSM method is designed by 1-D code and verified by 3-D simulations. This L-band Klystron can produce 1.4MW microwave power with the conversion efficiency of 80%, while the total length of interaction region is less than 2 meters.

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