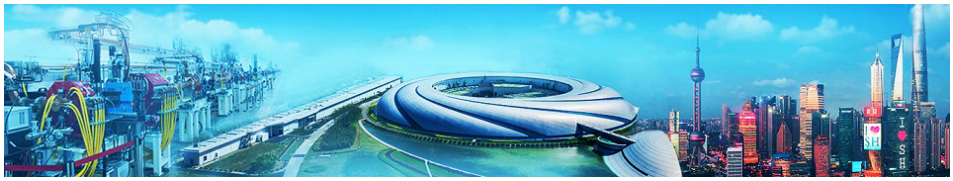

Contribution ID: **26** Type: **not specified**

High efficiency power source development

Friday 8 June 2018 09:00 (25 minutes)

A number of Toshiba's Klystrons E37113 with output RF power of 6MW and 44% efficiency are currently in operation in X-box3 at CERN. To increase the efficiency, thus RF power production of existing tube, whilst preserving perveance and modulator itself, the new design of the HE klystron has been done at CERN. This design is based on the COM bunching technology. However, due to the high beam perveance and relatively large beam aperture in existing tube, it appeared to be rather difficult to extract the RF power efficiently, even the bunch quality was considerably improved by the COM method. Coupled cell structures were adopted for the output cavity design to enhance the power extraction efficiency and to preserve reasonable (<80kV/m) level of the maximum surface electric field. The coupled cavities theory was implemented into the CERN's klystron code KlyC to facilitate fast and efficient optimisation of such klystrons. Latest results show that new design of X-band klystron provides efficiency above 60%, that will correspond to 8.3 MW output power expected. This design was verified using CST/3D PIC simulation and the reach of efficiency at a level 60% was confirmed. The design and simulation results of the new 8 MW X-band HE tube are presented.

Authors: CAI, Jinchi (CERN); SYRATCHEV, Igor (CERN)

Presenter: CAI, Jinchi (CERN)

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