**120 MW Class X-Band Klystron Design for JLC using the MAGIC Code**, Y.H. CHIN, S. FUKUDA, S. MATSUMOTO, S. MICHIZONO, H. TSUTSUI, KEK - In this paper, we present a new design of 120 MW class x-band klystron (XB72k No.10) for JLC, and simulation results using the 2-D and 3-D MAGIC codes. It utilizes a four-cell traveling-wave output structure in a 2pi/3 mode and a conventional solenoidal beam focusing. It has a microperveance of 1.13 (i.e. the beam current of 460 A) at 550 kV and a predicted efficiency of more than 50% at 800 ns pulse width. The traveling-wave structure was designed using the MAGIC, SUPERFISH and MAFIA codes. The MAGIC is a particle-in-cell code and solves the Maxwell equations directly at particle presence by the finite difference method in time and space. It requires only the geometrical structure of the cavity and assumes no model for the beam-cavity interaction. In the 2-D calculations, the 3-D output couplers are replaced by the axis-symmetrical resistive material with the variable length to simulate the correct S-matrix. The detailed analysis of simulation results show that the designed output cavity has an approximately constant gradient and quite symmetrical mode patterns despite of different cell lengths and apertures. The application of the MAGIC code to the XB72k No.8 klystron demonstrates that it gives a reasonably-well agreement with measured efficiencies.