

The Characteristic of double liquid stub tuner in the KSTAR ICRF system

J. S. Yoon, Y. D. Bae, J. G. Kwak and B. G. Hong

Korea Atomic Energy Research Institute, 150 Dukjin-Dong, Yuseong-Gu, Daejeon 305-353, Korea

The double liquid stub tuner was developed for the matching system of the Korean Superconducting Tokamak Advanced Research (KSTAR) ion cyclotron range of frequencies (ICRF) system. Maximum RF power is transmitted from a transmitter to an antenna in the KSTAR ICRF system when a matching condition is sustained between a transmitter and an antenna. The double liquid stub tuner creates a matching condition between a transmitter and an antenna. These liquid matching systems contain a liquid between the inner and outer conductors of the coaxial transmission line. The double liquid stub tuner system made of a 9-3/16" nominal-diameter aluminum transmission line consists of two liquid stub tuners, two T-junction connectors, a transmission line inserted between two liquid stub tuners. Disks of Teflon are inserted between the liquid area and the gas area to stop a diffusion of the vaporized oil to other parts of the stub tuner. A simulation for the double liquid stub tuner system is performed to find the matching condition. With the simulation result, the length of the transmission line and the level of the liquid are calculated. A liquid transportation system was designed and fabricated for the KSTAR ICRF system. The control circuit for the liquid transportation system is also developed. The developed liquid transportation system is composed of a liquid level display of the liquid in the liquid matching system, a speed control, and a valve control.