Optimization of HCN laser interferometer power automatic control system on EAST Tokamak

J.B. Zhang[1*], H.Q. Liu[1], Y. Zhang[1], X.C. Wei[1]and Y.X. Jie[1]

[1] *Institute of Plasma Physics, Chinese Academy of Sciences,230031 Hefei, China*

The HCN laser interferometer is one of the necessary diagnostics for the operation of EAST Tokamak device, which can provide the necessary density feedback signal for the operation of EAST. Previously, an electric platform was used as an actuator to automatically adjust the HCN laser power[1], but the actuator adjustment precision is not very well. In addition, the control algorithm of the control system moves the actuator from a wave to next wave, so the power will be zero, which can affect EAST operation. At present, a new actuator is developed, using a piezoelectric ceramic and a stepper motor. The stepper motor is for coarse adjustment, the piezoelectric ceramic is for precise adjustment, so the precision of the new actuator is improved, accuracy up to nanometers. In addition, PID control method and slope judgment algorithm are used to optimize the power control system algorithm, which can make the output power of the laser stable at a peak and avoid the state of zero power. This is important for EAST operation.

[1] J.B. Zhang, *et al.* 2015 *JINST* 10 C11004

*Presenting author: zhangjibo@ipp.ac.cn