**Development of the FIR laser interferometer for the HL-2M tokamak**

Y.G. Li1, Yuan. Li1, Z.H. Wang1, J.R. Mou1, J. Yi1, R.N. Wen1, B.H. Deng1, Z.B. Shi1

*1Southwestern Institute of Physics, P.O.Box432, Chengdu 610041, China*

A five-channel Michelson-type far-infrared (FIR) laser interferometer has been developed on HL-2M tokamak for the electron density measurement in 2022. Two CO2 laser pumped formic-acid lasers (HCOOH, *λ*=432.5μm) are used as the probe sources. Two waveguides as long as 18.0 meters are employed for the laser beams transmission from the laser room to the interferometry tower. Five metallic retro-reflectors with 50mm aperture are mounted in the vacuum vessel for the wave reflection. In the 2022 experimental campaign, five channels of line-integrated electron densities can be measured, with a temporal resolution of 1.0μs and a spacial resolution of 10cm, corresponding the geometric positions of -20, -10, 0, 10, 20cm along the vertical direction, here 0 indicates the geometrical center of HL-2M. In the near future, up to 13 probe channels will be developed for the HL-2M tokamak, and the monofunctional interferometer will be upgraded to three-wave based polarimeter/interferometer. Thereupon, both the electron density and Faraday rotation angle can be simultaneously measured for the same probe channel.