

## HTPD 2018



Contribution ID : 360

Type : not specified

## 2.35 Initial Beam Emission Spectroscopy diagnostic system on the HL-2A tokamak

Monday, 16 April 2018 10:46 (120)

A Beam Emission Spectroscopy system is being developed and deployed at the HL-2A tokamak to measure local low wavenumber ( $k_{\perp} \rho_i < 1$ ) density fluctuations by observing Doppler-shifted emission from a 50 kV deuterium heating neutral beam. High spatial resolution ( $\Delta r \leq 1 \text{ cm}$ ,  $\Delta z \leq 1.5 \text{ cm}$ ) measurements are obtained with a 2 MHz sampling rate. An  $f/1.6$ ,  $f=280 \text{ mm}$  radiation-resistant in-vacuum objective lens couples with an off-axis field lens to image the beam to a curved surface with an appropriate angle for coupling to optical fibers. A 2x3 bundle of 1-mm diameter, 10-meter fibers conveys light for each spatial channel to detector arrays. A collimating lens passes light to a 1-nm bandwidth (659.2-660.2 nm, Doppler-shifted D-alpha emission) interference filter. An aspheric lens focuses light to a 2.65 mm square photodiode. High frequency, high-gain, low-noise preamplifiers sample the light intensity at a Nyquist frequency of 1 MHz with a high S/N ratio. A first set of 16 detector channels (12 plasma observing channels, configured in a 6(radial) x 2(poloidal) array) were installed and tested at HL-2A, covering the radial zone  $r/a=0.7\text{--}1.05$ . The frequency and wavenumber spectra have been measured during various plasma conditions, and primary measurements will be presented.

Primary author(s) : WU, Yifan (University of Science and Technology of China)

Co-author(s) : KE, Rui (Tsinghua University); JAEHNIG, Kurt (University of Wisconsin-Madison); KRIETE, Matt (University of Wisconsin-Madison); MCKEE, George (University of Wisconsin-Madison); YAN, Zheng (University of Wisconsin-Madison); WU, Ting (Southwestern of Institute of Physics); XU, Min (Southwestern of Institute of Physics)

Presenter(s) : WU, Yifan (University of Science and Technology of China); KE, Rui (Tsinghua University); JAEHNIG, Kurt (University of Wisconsin-Madison); KRIETE, Matt (University of Wisconsin-Madison); MCKEE, George (University of Wisconsin-Madison); YAN, Zheng (University of Wisconsin-Madison); WU, Ting (Southwestern of Institute of Physics); XU, Min (Southwestern of Institute of Physics)

Session Classification : Session #2, Monday Morning Poster Session