

Development and First Result of Phase Contrast Imaging Diagnostic on HL-2A tokamak

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We report the development of Phase Contrast Imaging (PCI) diagnostic on HL-2A tokamak, together with first experimental results. This diagnostic is to measure the phase shift of a CO₂ laser probe when it passes through plasma. This system is designed to diagnose plasma density fluctuations with the maximum wavenumber of 15 cm⁻¹. The designed wavenumber resolution is 2cm⁻¹, and the time resolution can reach 0.2 μs. The broad kps ranges from 0.2 to 3. The signal series in different PCI channels show a pronounced modulation of incident laser beam by the sound wave. The conversion relationship between the chord integral plasma density fluctuation and the signal intensity is $2.3 \times 10^{13} \text{ m}^{-2}/\text{mV}$, indicating a high sensitivity. First experimental results show the ability for turbulence investigation.