The new development of motional Stark effect polarimeter in HL-2A tokamak

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Abstract

In 2017 experimental campaign, a 7-channel motional Stark effect (MSE) diagnostic based on dual photo-elastic modulators (PEMs) now is installed and operating routinely on HL-2A tokamak with 7 spatial resolution of ~3 cm, and time resolution of 1~5 ms. For each channel, 6 1-millimeter silicon fibers are applied. And off-the-shelf avalanche photodiode detectors with frequency band of 250 kHz are adapted due to its quantum efficiency up to ~83% at 660 nm. The instrument observes the σ component of the half energy components from $1^{\#}$ or $4^{\#}$ neutral been injector. The beam emission spectra are filtered by a monochrometer, and the filter is controlled by an absolutely calibrated rotator, which can change the tilting angle of the filter with velocity of 720 degree/s, corresponding to the wavelength change of 288 nm/s with the filter. The rapid angle change of the monochrometer enables the wavelength to be swept during and between the discharges.