Evaluating the tungsten and carbon impurity fractions in hydrogen plasmas from the Stark broadening of H_β line

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The analysis of spectral line profiles of neutral hydrogen is actively used to diagnose tokamak divertor plasma [1]. In this paper, reduced mass effect [2] is proposed to be used to estimate the concentration of impurities in the materials of the first wall of the tokamak. Using the theory developed in [3], calibration dependences of the intensity in the center of the H_β spectral line on the impurity concentration were obtained and the principal possibility of using the reduced mass effect to estimate the concentration of a homogeneous admixture of tungsten and carbon in the divertor plasma was shown.

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[3] Demura A V, Lisitsa V S and Sholin G V 1977 *Journal of Experimental Physics* **73** 400–401