

UNCOMMON LINE SHAPES OF Cu I LINES IN LASER INDUCED PLASMA

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Laser induced plasma (LIP) is generated by focusing a high power pulsed laser beam on the target surface. At low surrounding gas pressures laser induced plasma expands very fast with pronounced density and temperature gradients. These features result in a complex form of the spectral lines, see Fig 1.

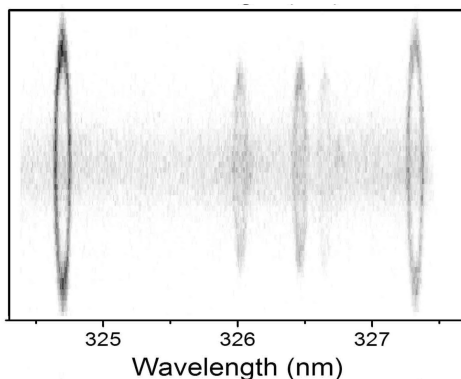


Figure 1: Spectrum of Cu I lines 324.75 nm and 327.40 nm recorded side-on in the image mode of CCD camera. All spectral lines have the oval form.

We show that these characteristic profiles are caused by distinct Doppler effect. The profiles contain valuable information regarding the expansion velocity, plasma deceleration, emitters temperature, electron density and so on. We propose a simple procedure for numerical processing of the presented profiles. The expansion velocity is found to be $v \sim 45\,000$ m/s, while temperature of the emitters is $T \sim 10^5$ K. The electron density is low, marginally above the detection limit. This features put LIP in an extremely interesting spectroscopic source with great potential in studying the spectral line shapes.