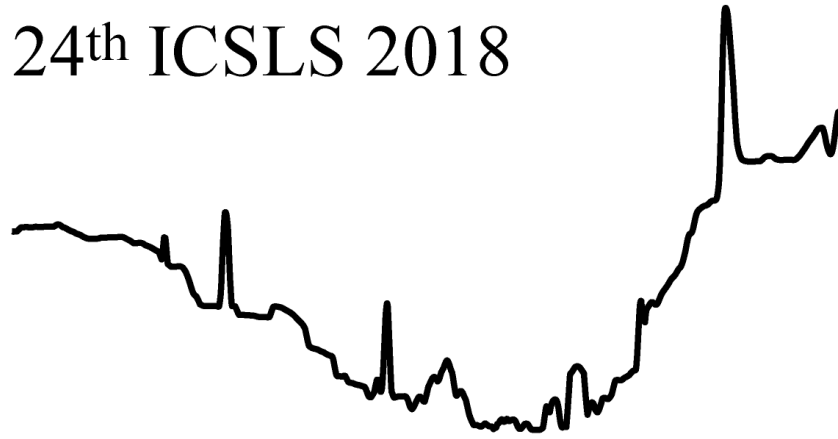
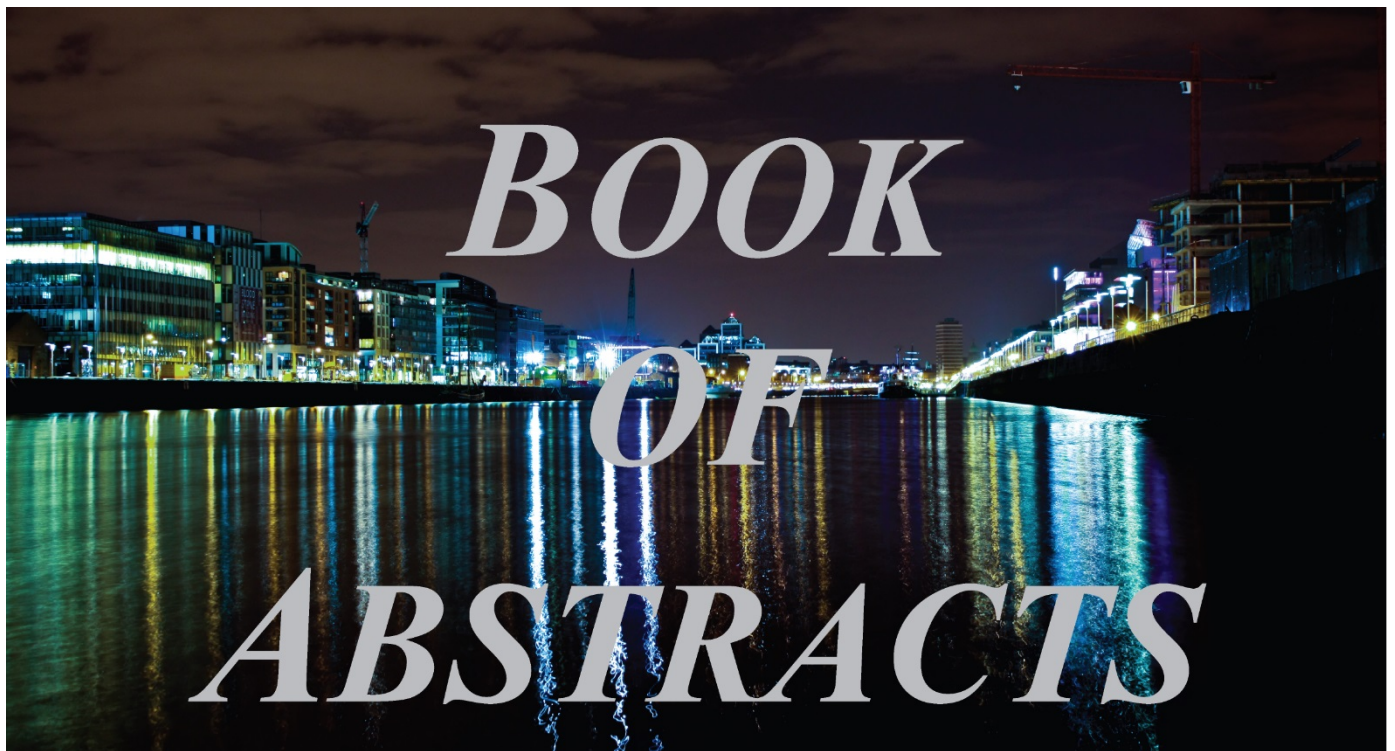


24<sup>th</sup> ICSLS 2018



17 – 22 June 2018, Dublin, Ireland

24<sup>th</sup> International Conference on  
Spectral Line Shapes



17 – 22 June 2018, Dublin Ireland

# Validity Of Deconvolution Method For Multicomponent Spectral Line Shapes

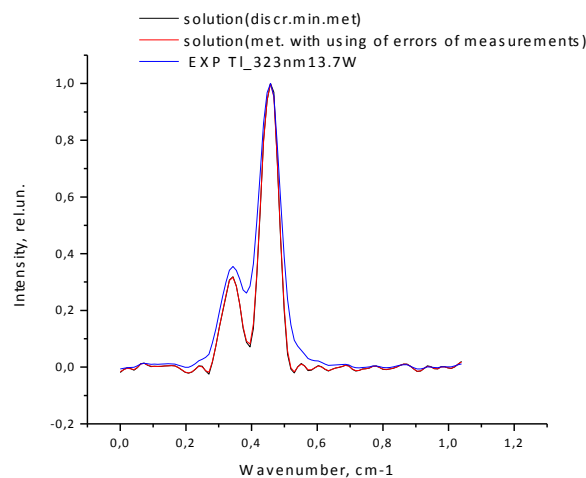
Natalja Zorina<sup>a</sup>, Gita Revalde<sup>b</sup>, Atis Skudra<sup>a</sup>,

<sup>a</sup> *Institute of Atomic Physics and Spectroscopy, University of Latvia, Skunu str 4, Riga, LV 1050, Latvia, e-mail: natalja.zorina@lu.lv*

<sup>b</sup> *Institute of Technical Physics, Department of Materials Sciences and Applied Chemistry, Riga Technical University, Azenes str. 3/7, Riga, Latvia*

The neglecting the instrumental function, in the case of low –pressure or cold plasma when instrument function is on the same order as experimental profile gives huge error [1] for the FWHM estimation and consequently for discharge temperature estimation. The instrumental function can conceal detailed structure of the spectral line, like the dip in the line centre caused by the self-absorption (self-reversal).

We present our study of deconvolution of multicomponent spectral line profiles in this paper. The study consists of deconvolution of theoretically modeled profiles as well as 323nm of Tl<sup>205</sup> profiles, emitted from high frequency electrodeless lamps (HFEDLs). The solution of ill posed inverse task was implemented using Tikhonov regularization algorithm. The regularization parameter was obtained by two independent methods.



**Figure 1.** The comparison of 323nm of Tl<sup>205</sup> experimental spectral line with deconvoluted ones .

## Acknowledgements

The research was partly supported by project „Atomic physics, optical technology and medical physics (LU IAPS) ”

## References

[1] N. Zorina, Deconvolution of the spectral line profiles for the plasma temperature estimation, Nuclear Inst. and Methods in Physics Research A, 2010, **623** , 763-765