

Detailed line-shape modeling for diagnostics of high-energy-density plasmas

E. Stambulchik^{*}

Weizmann Institute of Science, Rehovot 7610001, Israel

Radiation of mid- Z tracer species is widely used for diagnosing high-energy-density plasmas. In particular, the Stark broadening of K -shell transitions is a ubiquitous tool for inferring the electron density. Almost universally, it is a single quantity – the line width – that is used for the analysis. Here, however, we explore finer details of line profiles, including the shift, that may allow for determining the plasma density alternatively and for probing the atomic composition of the tracer ion environment. The calculations were carried out using computer simulations [1], recently extended [2] to treat the radiator–plasma interaction beyond the standard multipole approximation.

References

- [1] E. Stambulchik and Y. Maron, J. Quant. Rad. Trans. **99**, 730–749 (2006).
- [2] E. Stambulchik and C. A. Iglesias, Phys. Rev. E **105**, 055210 (2022).

^{*}E-mail: evgeny.stambulchik@weizmann.ac.il