

## Photoionization analysis of chemodynamical simulations: Cloudy C23.01 vs C08.00

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Photoionization modelling allows us to monitor the radiation transfer taking into account all important processes in nebular plasmas.

The spatial distributions of densities, chemical abundances and temperatures are needed for such modelling were obtained from chemodynamical simulations of dwarf galaxies. In present work we check the reliability of older version of CLOUDY C08.00 [1] in comparison with newest version - C23.01. The reason of this was small coding mistake since 90's fixed recently in CLOUDY C23.01 [2] which changed high-ionized gas clouds spectrum and also higher spatial resolution of newest version made us make sure that C08.00 is still reliable for final calculations. The our wrapper for multicomponent photoionization modelling (MPhM) [3, 4] based on chemodynamical simulations [5] was rewritten for C23.01 version. Then we recalculated one of MPhM using new MPhM wrapper based on C23.01 and compared the obtained ionization structure (the electron temperatures and densities, the radial distribution of recombination and forbidden lines emissivity and ionic oxygen abundances in various ionization stages) with one calculated earlier using old wrapper version based on C08.00. Also we analyze the differences in these parameters as well as in predicted emission line spectra.

[1] - Ferland G. J., 2008, Hazy a Brief Introduction to Cloudy, Version 08 (University of Kentucky Internal Report), p. 807 (<http://www.nublado.org>)

[2] - Gunasekera Ch. M., van Hoof P. A. M., Chatzikos M., Ferland G. J. The 23.01 Release of Cloudy. Research Notes of the AAS 7, 11, id.246 (2023).

[3] - Melekh B., Recchi S., Hensler G., Buhajenko O., 2015, MNRAS, 450, 111

[4] - Melekh B., Buhajenko O., Koshmak I., 2024, MNRAS 532

[5] - Recchi S., Hensler G., 2013, A&A, 551, A41 (RH13).

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