

The 2024 status report on the LXCat project

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The LXCat project [1] aims to provide an on-line platform for the curation of data required for modeling the electron and ion components of Low Temperature Plasmas (LTPs). This platform is the open-access LXCat website (<https://lxcat.net>). The data is provided by individual contributors, each maintaining their own database. The LXCat project is a truly global project as over 60 people from around the world participate by contributing data or by voluntarily working on other aspects, such as development, administration, or community outreach activities. The available types of data are electron-neutral and ion-neutral scattering cross sections (both integrated and differential), interaction potentials, oscillator strengths, rate coefficients, and transport parameters, such as mobility and diffusion coefficients. The goal of the LXCat project is dissemination of LTP data, and it does not recommend data. Therefore, data for the same process can occur multiple times as it can be part of different databases.

The platform provides tools for searching and downloading specific data, and results can be plotted and compared between different databases. In addition, complete sets of electron-neutral cross sections are available for a range of pure gases and mixtures, which can directly be used in an on-line version of the BOLSIG+ Boltzmann solver [2]. The calculated transport parameters and rate coefficients can subsequently be compared to data from other databases.

The services provided by LXCat have not changed significantly since its inception over a decade ago. To keep up with evolving needs of the LTP community, the LXCat team has been working on a complete redesign and reimplementing of the platform [3]. The new LXCat uses a new data format, new database, and new frontend, and provides many new functionalities. In order to gather valuable feedback from the community, a demonstration of the new platform is made available, which exhibits most capabilities. This demonstration platform offers a small set of representative data from the IST-Lisbon [4] and Phelps [5] databases converted from LXCat.

Latest updates of the current platform are presented as well as the status and goals of the redesign. The LXCat team is interested in contacting members of the LTP community about data needs and about how people can volunteer to participate in this project.

L.L. Alves was supported by Portuguese FCT under project 2022.04128.PTDC [6].

[1] E. Carbone *et al.*, Data needs for modeling low-temperature non-equilibrium plasmas: The LXCat project, history, perspectives and a tutorial, *Atoms* **9** (2021). <https://www.mdpi.com/2218-2004/9/1/16>

[2] G.J.M. Hagelaar, L.C. Pitchford, Solving the boltzmann equation to obtain electron transport coefficients and rate coefficients for fluid models, *Plasma Sources Science and Technology* **14** (2005) 722. <https://dx.doi.org/10.1088/0963-0252/14/4/011>

[3] D. Boer, S. Verhoeven, S. Ali, W. Graef, J. van Dijk, LXCat3. <https://github.com/LXCat-project/LXCat>

[4] L.L. Alves, The IST-Lisbon database on LXCat, *J. Phys. Conf. Series* (2014), 565, 1.

[5] Archived copy of Arthur V. Phelps website <https://web.archive.org/web/20180820113924/http://jilawww.colorado.edu/~avp/>

[6] Interação-Plasma-Superfície (Dados e ferramenTas) Modelização aCOplada <https://doi.org/10.54499/2022.04128.PTDC>