

CollisionDB: an online repository of plasma collisional data sets

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CollisionDB [1] is a repository for the longterm curation of collisional cross sections and rate coefficients. Any data set described in a peer-reviewed article which has been assigned a DOI and is published in a recognised scientific journal is, in principle, eligible for inclusion in the database. As of May 2023 the resource contains 122 352 data sets.

Each data set included in CollisionDB is associated with metadata providing an unambiguous description of its units, provenance, method of calculation or measurement and citation. Fit functions and the corresponding coefficients are provided, where available. An online interface allows data sets to be searched by reactant and product species (including by quantum state where this is resolved), publication DOI, author name and process type (identified as one of a set of documented process codes [2], e.g. EIN = electron-impact ionization).

The online interface also allows all data sets matching a query to be downloaded in a single, compressed archive and for individual data sets to be visualized in an interactive, browser-based plot.

CollisionDB exposes an Application Programming Interface (API), which can be used to request data from the database from users' own code using JSON-based queries. A Python package, `pycollisiondb`, [3] has been released to provide a high-level access to CollisionDB, with library functions for aggregating, visualizing and transforming data sets.

References

1. <https://db-amdis.org/collisiondb/>
2. C. Hill et al., *Classification of Processes in Plasma Physics*, v2.4, March 2022, <https://amdis.iaea.org/databases/processes/>
3. <https://github.com/xnx/pycollisiondb>

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