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The Phys4Entry database[1]

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The Phys4Entry DB is a database of state-selected dynamical information for elementary processes relevant to the state-to-state kinetic modeling of planetary-atmosphere entry conditions. The DB is intended to the challenging goal of complementing the information in the existing web-access databases, collecting and validating data of collisional dynamics of elementary processes involving ground and excited chemical species, with resolution on the electronic, vibrational and rotational degrees of freedom. Four relevant classes of elementary processes are considered, i.e. electron-molecule collisions, atom/molecule-molecule collisions, atom/molecule surface interaction and photon-induced processes, constructing a taxonomy for process classification. Data populating the DB are largely originated by the coordinated research activity done in the frame of the Phys4Entry FP7 project, considering different theoretical approaches from quantum to semi-classical or quasi-classical molecular dynamics. Nevertheless the results, obtained in the Bari plasma chemistry labs in years of research devoted to the construction of reliable state-to-state kinetic models for hydrogen and air plasmas, are also transferred to the DB. Two DB interfaces have been created for different *roles* allowed to different *actions*: the CONTRIBUTOR, uploading new processes, and the INQUIRER, submitting queries, to access the complete information about the records, through a graphical tool, displaying energy or roto-vibrational dependence of dynamical data, or through the *export* action to download ascii datafiles. The DB is expected to have a significant impact on the modeling community working also in scientific fields different from the aerothermodynamics (i.e. fusion, environment, ...), making practicable the state-to-state approach.

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