

ISMDB : A database of reference ISM models

E. Bron¹, D. Languignon¹, N. Moreau¹, F. Le Petit¹

¹ *LERMA, Observatoire de Paris, PSL University, Paris – France*

The rapid development of increasingly powerful telescopes in all wavelength ranges (ALMA/NOEMA, JWST, SKA, ELT...) creates a heightened need for efficient modeling tools allowing fast scientific exploitation of the observed data with state-of-the-art models that consistently describe the observable quantities across all wavelength domains.

ISMDB is an online application that gives access to large grids of precomputed models produced by international reference models for interstellar medium (ISM) environments: the Meudon PDR Code, describing the impact of radiative feedback on molecular gas, the Paris-Durham shock codes, describing mechanical feedback, and the Kosma-tau PDR code, thus allowing comparing the answers provided by different codes for better reliability. For each code, grids of models covering a large parameter space in several parameters are provided (e.g. for PDRs, conditions going from diffuse interstellar clouds to dense cores, dense strongly UV-irradiated PDRs or proplyd envelopes). In addition to allowing a traditional search by model parameters, the originality of ISMDB is to provide advanced data mining tools, allowing to search models that best fits observations in order to put constraints of key physical parameters of the environment, and this in the shortest time possible. It is now possible to find interpretation of data in a few minutes instead of days or weeks of work. This has been made possible first, thanks to the Simulation Data Model developed by IVOA and then, by re-thinking the way high-dimension data can be managed in a database and coupled to modern usages of web-semantics technics.

In this presentation, I will present ISMDB and the chain of analysis tools that we provide around ISMDB, as well as example applications illustrating the scientific interest of these tools, and recent and in progress developments.