

Stochastic modeling of the ISM processes

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Our understanding of the physical and chemical processes in interstellar gas has made significant progress thanks to increasingly sophisticated numerical models. However, key problems remain while their resolution is essential to answer the major questions in the field. Examples are the modelling of chemical processes on grain surfaces or the impact of interstellar turbulence on gas chemistry. Partial answers have been provided, but the quantitative jump in modeling quality needed to fully answer the questions seems to face barriers that are difficult to overcome.

In this presentation, I will show that one of the blocking points is the very formalism used to simulate processes. Indeed, the approach adopted since the 1980s for modelling processes in interstellar gas is often based on the classical deterministic approach, whereas a number of fundamental physical and chemical processes are by nature probabilistic. Therefore, significant progress can probably only be made by reconsidering traditional approaches and inventing new ones, based on stochastic approaches. I will illustrate this on grain surface chemistry and turbulence [1,2,3].

Références

- [1] Bron E., Le Bourlot J, Le Petit F. *A&A*, 569, 100, (2014)
- [2] Bron E., Le Petit F., Le Bourlot J., *A&A*, 588, 27 (2016)
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