Titre :Turbulence in the diffuse multi-phase interstellar medium

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Abstract : The diffuse interstellar medium of the Milky Way observed in the vicinity of the Sun offers a unique opportunity to study interstellar turbulence over a vast range of scales, from the injection scale of turbulence at L~100 pc down to mpc scales, close to the energy dissipation regime.
In this talk I will first present how 21 cm data can be used to study the multi-phase properties of interstellar turbulence. As an illustration I will present recent result on the turbulence of the warm phase of the diffuse ISM, the inter-cloud medium at T~6000 K. Thanks to a dedicated data segmentation tool (RHOSA) we were able to characterise the multi-scale properties of turbulence in this volume filling medium for the first time, providing essential constraints on the initial conditions that lead to the formation of cold clouds. In a second part of the talk, I will show how new optical survey of the high Galactic sky, first aimed at detecting galaxies, can be used to describe the statistical properties of the interstellar density field over 3 orders of magnitudes in scales, down to mpc scales.