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# ROHSA : the old dream of hyperspectral data segmentation

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## Abstract

The description of the complex dynamics of the interstellar medium gas remains a challenge to understand the structure formation process in galaxies. Hyperspectral imaging of emission lines produces large data cubes that contain information about the density, velocity and temperature of the gas along each line of sight. Even in the most favorable conditions where an optically thin line is observed, going back to the three-dimensional properties of the ISM is difficult. In this talk I will present ROHSA, a method to separate coherent fields in hyperspectral cubes using a regularization scheme that favor spatially coherent solutions. I will present applications across the EM spectrum, from the optical to the radio. In particular I will show how the cold and warm HI can be imaged, opening the possibility to study the multi-scale properties of the multi-phase ISM.

**Keywords:** data segmentation, hyperspectral data, ISM phases, ISM structure

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