

Wavelet Analysis Applied to the IRAS Infrared Cirrus

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The structure of infrared cirrus clouds are analyzed with Laplacian pyramid transforms, a form of non-orthogonal wavelets. These transforms are generally better suited for analyzing structure than orthogonal wavelets because they provide more flexibility in the structure of the encoding functions and are computationally efficient. Pyramid transforms provide a means to decompose images into their spatial frequency components such that all spatial scales are treated in an equivalent manner. This method of signal decomposition is the basis of all scale invariant multi-resolution representations such as pyramids and wavelets. Pyramid transforms are important tools to analyze, detect, and characterize of structural components in astronomical maps. The multi-scale transform analysis is applied to IRAS 100 and 60 μm maps of cirrus clouds. In the maps, for example, one can identify different filaments, fragments and clumps. These structures are analyzed with respect to their statistical distribution and Hausdorff dimension for evidence of the scaling relationships in the cirrus clouds,