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Power law structure of the ISM: HI, CO and IR fractal dimension analysis in nearby galaxies LORRAINE BOWMAN, DAVE WESTPFAHL, NRAO and NMT, JUERGEN OTT, NRAO — The properties of turbulence in galaxies are a fundamental part of our understanding of the ISM as a complex and dynamic system. Turbulence can be probed by analyzing the fractal dimension of contours of the gas. The fractal dimension of an object is linked to its change of detail with change of scale. Any structure with non-integer fractal dimension obeys a power law. The Things (HI), Heracles (CO) and Sings (IR) surveys share a common galaxy sample from which six galaxies was selected based on their orientation in order to avoid any inclination effects. For each galaxy, the HI, 70 micron IR and CO intensity distribution maps and proton maps (obtained by converting the CO to H₂ and adding the HI) were analysed. The fractal dimension of contours for each map were found to have overall different trends and different averages over intensity. This hints that the the turbulence has different effects, and likely different causes in the various constituents of the ISM. In particular, the dust phase (70 microns IR) and the gas phases (HI and CO) have different fractal dimensions. We discuss here the meaning of these results.

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