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Dust emission from the atomic and molecular gas in M 33: a changing β

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Abstract. We use the very recently completed high-resolution IRAM CO survey of M33 with the high-resolution HI observations (published by Gratier *et al.* 2010, *A&A*, 522, 3) and Herschel Far-IR and submillimeter mapping observations to study how the dust behaves in the molecular and atomic gas phases of the interstellar medium (ISM). M33 is a "young" object in that it is gas-rich with a young stellar population and low metallicity as compared to large spirals like the Milky Way or Andromeda. Nonetheless, it is very clearly a spiral galaxy with a thin and reasonably axisymmetric disk. As such, it can be viewed as a stepping stone towards less evolved objects like magellanic irregulars (including the LMC and SMC) and perhaps distant objects in the early universe. More specifically, we look for radial variations in the dust emission spectrum (β parameter) as well as comparing regions dominated by either H_2 or HI. *The grey-body emission spectrum flattens (lower β) with galactocentric distance and generally is flatter in the atomic medium as compared to the molecular gas.*

Keywords. Galaxies: Individual: M 33 – Galaxies: Local Group – Galaxies: ISM – ISM: Clouds

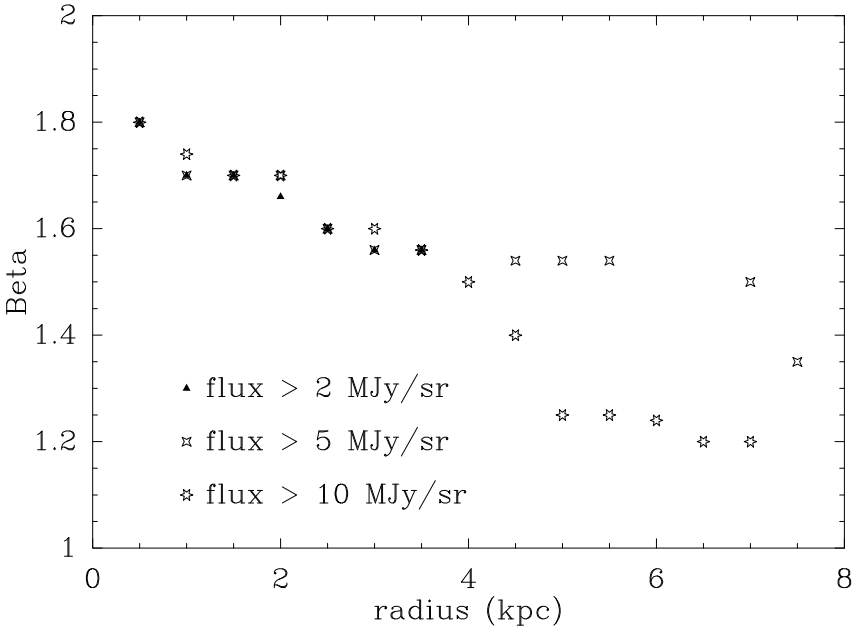

Figure 1. Radial decline in β for varying flux thresholds in M 33. β was obtained by fitting a grey-body ($S_\nu \propto (\nu/\nu_0)^\beta B_{\nu,T}$) to each pixel in M33 with a 250μm flux above the thresholds indicated.