



A Spitzer IRS Survey of NGC 1333: Insights into disk evolution from a very young cluster

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(Submitted on 16 Jul 2011 (v1), last revised 23 Apr 2012 (this version, v3))

We report on the $\lambda = 5\text{--}36\ \mu\text{m}$ Spitzer Infrared Spectrograph spectra of 79 young stellar objects in the very young nearby cluster NGC 1333. NGC 1333's youth enables the study of early protoplanetary disk properties, such as the degree of settling as well as the formation of gaps and clearings. We construct spectral energy distributions (SEDs) using our IRS data as well as published photometry and classify our sample into SED classes. Using "extinction-free" spectral indices, we determine whether the disk, envelope, or photosphere dominates the spectrum. We analyze the dereddened spectra of objects which show disk dominated emission using spectral indices and properties of silicate features in order to study the vertical and radial structure of protoplanetary disks in NGC 1333. At least nine objects in our sample of NGC 1333 show signs of large (several AU) radial gaps or clearings in their inner disk. Disks with radial gaps in NGC 1333 show more-nearly pristine silicate dust than their radially continuous counterparts. We compare properties of disks in NGC 1333 to those in three other well studied regions, Taurus-Auriga, Ophiuchus and Chamaeleon I, and find no difference in their degree of sedimentation and dust processing.

Comments: 67 pages, 20 figures, accepted to The Astrophysical Journal Supplement Series

Subjects: **Solar and Stellar Astrophysics (astro-ph.SR)**

Journal reference: ApJS, 201, 12 (2012)

DOI: [10.1088/0067-0049/201/2/12](https://doi.org/10.1088/0067-0049/201/2/12)

Cite as: [arXiv:1107.3261](https://arxiv.org/abs/1107.3261) [astro-ph.SR]
(or [arXiv:1107.3261v3](https://arxiv.org/abs/1107.3261v3) [astro-ph.SR] for this version)

Submission history

From: Laura A. Arnold [[view email](#)]

[v1] Sat, 16 Jul 2011 22:25:22 GMT (436kb)

[v2] Tue, 19 Jul 2011 02:08:06 GMT (436kb)

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