Rosario Cecilio-Flores-Elie | Midterm | Disks Class II

- **Case Study**: Cazzoletti, P., van Terwisga, S., Andrews, S., Lodato, G., Hacar, A., Gurwell, M., et al. "ALMA band 6 survey for Class II YSOs in CrA." Astronomy & Astrophysics, vol. 626, A11, 2019.

The paper presents the results of an ALMA survey of 43 Class II protoplanetary disks in the nearby Corona Australis (CrA) star-forming region. It aims to measure their dust content and understand how it scales with the stellar properties. The study found that the average mm fluxes from the disks in CrA are low, resulting in a low disk-mass distribution. Only three disks in the sample were found to have a dust mass sufficient to form giant planet cores. The correlation between disk dust mass and stellar mass was confirmed, with a much lower intercept due to the low mass of the disks in the CrA region. The study also explores potential factors influencing the low mass distribution of protoplanetary disks in the CrA region, such as the formation efficiency of disks in cold parent clouds and the impact of magnetic braking. The findings suggest that the low disk mass distribution observed in the CrA region may be a consequence of a population of disks that has formed with a low mass from the very beginning, potentially influenced by the initial conditions of the parent cloud. The paper concludes by emphasizing the importance of further surveys, including younger Class 0 and I objects in CrA and other star-forming regions, to test the critical role of initial conditions in shaping the physical properties of circumstellar disks.

- Astrobites. "Review Article: Protoplanetary Disks and Their Evolution." Astrobites, 11 Mar. 2011, astrobites.org/2011/03/11/review-article-protoplanetary-disks-and-their-evolution/.

The article "Protoplanetary Disks and Their Evolution" by Jonathan P. Williams and Lucas A. Cieza delves into the study of protoplanetary disks, crucial in understanding planet formation. These disks, observed through space-based infrared and ground-based sub-mm telescopes, play a vital role in the birth of planetary systems. The review covers the life cycle of these disks, from formation in collapsing molecular clouds to the emergence of planetary systems. It highlights the importance of (sub)millimeter interferometry in studying outer disk properties and anticipates advancements with tools like the Atacama Large Millimeter Array. Understanding disk evolution, disk mass transport, and the composition of gas and dust particles within these systems are key focus areas in this field.

- Armitage, Philip J. "Astrophysics of Planet Formation." 2009, p. 66.

Section 3.1 discusses the various techniques used to detect and observe protoplanetary disks, including wide-field infrared imaging and molecular line observations. It emphasizes that measurements of the fraction of young stars exhibiting infrared excesses provide the strongest constraints on disk evolution.

Figures:
Class II - Disk Formation:
http://burro.case.edu/Academics/Astr221/SolarSys/Formation/starform.html
https://exoplanets.unm.edu/phys480_581/DanaAnderson_disk_lecture.pdf