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Describe The Inconsistency Of Observational Results With Theoretical Models In Explaining The Evolution Of Planetary Disks

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ABSTRACT

This paper discusses the incompatibility of theoretical models and observational results, which is one of the most pressing issues in astrophysics today, and points out the shortcomings of theoretical models in the formation of planets as a result.

KEYWORDS

Planets, protoplanetary disk, accreditation, accreditation disk, planet formation.

INTRODUCTION

In planetary population synthesis models, some basic parameters of disk structure and mass growth rate are compared with observations. Such a comparison means, on the one hand, confirming the assumptions of the models and, on the other hand, that the current models need to be reconsidered.

Although it is now widely accepted that exoplanetary systems are not the same, scientists are debating how to explain their formation and diversity. In particular, one of the main shortcomings of this work is the correct explanation of the properties of protoplanetary disks, the location of the planets, in modern models of planetary formation.

In recent years, much effort has been put into models of disk evolution, planetary formation, and population synthesis. The exact properties of the disks during planetary formation, from the tiny grains of dust to the formation of life factors, and the precise process that regulates the transition from interplanetary to planetary nuclei, are still unknown.

ANALYZES

According to theoretical models, planets are formed from dust and gases in the disks around young stars. These discs are a natural result of the process of star formation, which means that all young stars can have a planetary system. Circular star discs evolve over millions of years, eventually spreading, and the process of nuclear accretion is compared to the time when planets formed. This means that the processes of evolution and proliferation of disks play a crucial role in the formation of new planetary systems and contribute to the development of interplanetary diversity.

Based on theoretical data, spectroscopy of young stars reveals a wide range of infrared wavelengths, continuous emissions, and storms around a rotating dust star that form a star and form planets around it at an evolutionary stage. [1] The process of planet formation is divided into the following stages:

1. Star formation.

2. Huge disk.

3. Protoplanetary disk.

4. Disk distribution.

We know from theory that the planet formed, formed, and spread in the protoplanetary disk phase. But observations show that there are large planets in the giant disk phase. [2]

This means that in the third stage of the theory, the planet is not formed but is formed in the second stage earlier. The protoplanetary disk does not form a planet in the phase, but the planets formed at this stage determine their location. Only observational and theoretical data are relevant in the first and final stages. In the first stage, the star is born, and in the last stage, it becomes a unified system.

Based on observational data, we divide young stars into two categories:

1. Classic stars.

2. Weak stars.

These data were obtained from spectral analysis of young stars and were based on the strength of the emission line.

99% of the dust and gas that forms around young stars is gas, 1% is dust. With the help of the Spitzer Space Telescope, we can study the location of nearby stars and make detailed observations of the system. Using a telescope, we can identify a population of young stars with dusty discs. The infrared photosphere has high emission power lines. [3]

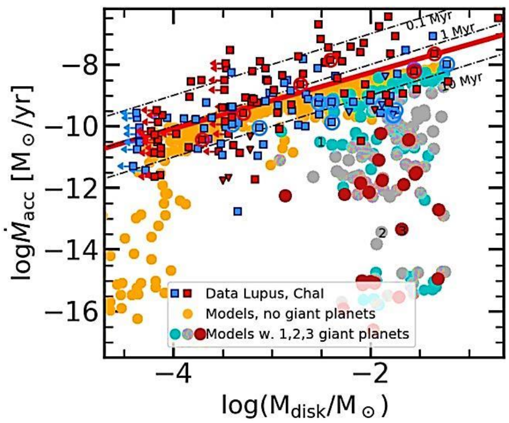

Figure 1

The blue circles indicate the level of mass accreditation and the mass of the disc for the population of discs observed in the location models of Lupus, red symbols and chameleon stars. Square-sized characters are disks with protoplanetary disk mass and mass accreditation speed; the poles are separated by squares showing the upper limits of the disk mass, the downward-facing triangles are separated by unknown accretors (the mass accreditation rate refers to objects corresponding to chromosphere emission) and the transition disks. The results are shown in red, which is consistent with the theory. Orange for giant planets, blue for one giant planet, gray for two giant planets, and brown for three giant planets.

Observations have shown that many theories about the four stages from the appearance of dust disks to the transition to the system state have not been proven. The following conclusions can be drawn from the observational theory: dust discs can form and spread in the first stage before the final stage. In this case, no system is formed around the star. The second step shows the exact fragmentation of the disks over time.

It should be noted that, the formation or initial evolution of an electron layer of longer wavelengths may be the result of the accumulation of the first dust or two generations of dust formed in a km-long interplanetary collision formed in a million years. [4]

We know that the planets were discovered around the stars of the main sequence. From the time of the giant disks to the time of the exoplanets, the synthesis models of the planetary population are finalized and developed based on the basic properties of protoplanetary disks.

If the disk mass around the young stars is 80% of the star mass, the lifetime of this model remains uncertain. That is, it will not work. However, 10% to 20% of the section is only suitable for models of disks with unformed giant planets. [5]

Strong photovoltaic winds cannot reproduce transitions when the mass of the planet's disks is 80%. [6]

Based on the data currently being discussed by world scientists and resolved as a result of observational data as opposed to theoretical data, we can say that if the mass of the disk is greater than the mass of the star, the propagation accreditation rate of the disk will be greater possible.

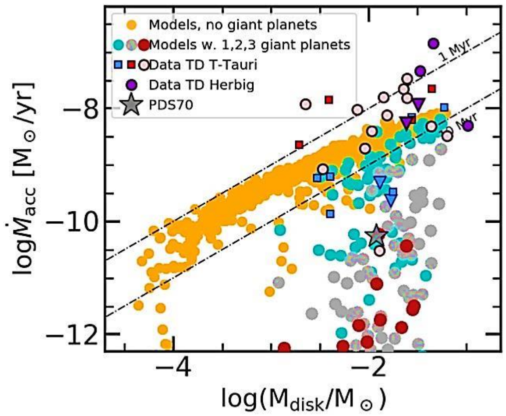

Figure 2

Here M⊙ is the accreditation rate, M_{disk} is the disk mass that forms the planet. Empty circles are for transition disks. Pink characters Disks orbiting Tauri stars. Purple circles are for discs that revolve around the stars Herbig and Pinilla.

However, there are a number of important differences. We can see that the accreditation rate is equal to the distribution (90.9%) of the data at any disk mass instead of the main location of the models (~3). This happens in part. This is because the models presented in this study are not combined with the usual observation uncertainties.

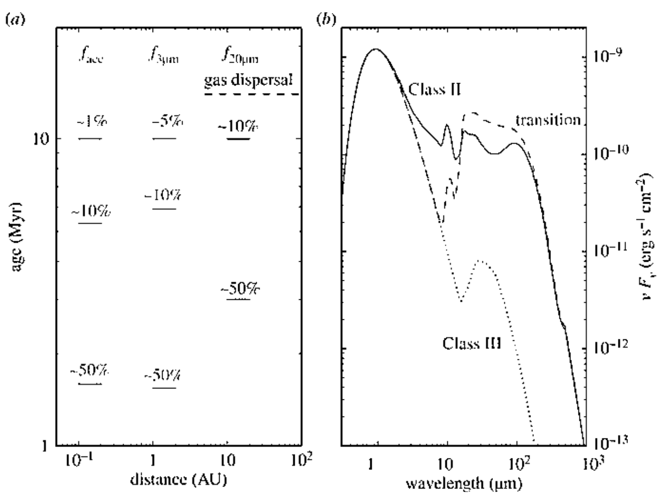

Figure 3

A) The propagation time (dust and gas) of the rotating star disks and the distance to the star.

B) Category 2 full disk, transition disk and third stage broken disk are described. [7]

Based on these observations, we can understand a sharp decrease in accreditation rate and disk density during the transition to the exoplanetary phase. As the antigravity pressure increases, it moves toward the final stage and the disc begins to spread. This period gives rise to different periods depending on the differences in the masses of the disk and the star.[8]

Observations show that population models resulting from theoretical calculations can only be applied to medium-sized protoplanetary disks. The meridian dimensions of the bumodels show a lower value. At the same time, the ratio of disc mass differences is not the same when compared to theoretical models. This is because of the very small amount of dissociation that takes place over a viscous period of time.

In contrast to the models obtained from the observations in the models based on theoretical data, the real-time gaps in which the dust gaps are compared during the gas diagnostic transition did not take into account the limitations in the development and propagation of the discs. Observations show that there is a gap in the giant disk and protoplanetary disk phases that weakens the planet that falls into this space and disintegrates as a result of the disk's accreditation rate as it enters the protoplanetary phase.

CONCLUSION

Even the most advanced photovoltaic model of the theoretical model does not include all the solutions to the processes of planet formation. We need models that include hydrodynamics to determine the profile of stellar heating sources, disk chemistry, dust evolution, wind speed, transition periods, and emission directions.

The relative values of gas and dust in the disk play a key role in determining how the disk develops and propagates. The period of quantitative modeling of planets begins only after the quantitative indicators of disk propagation have been determined by observation-limited modeling.

Most theoretical models are suitable for smaller disks, which are smaller than expected. These models are not considered an important model on giant disks.

Observational and theoretical models have been widely developed in recent years, making it difficult to make classical views of disk evolution and distribution.

REFERENCES

1. C.F.Manara, C.Mordasini, L.Testi, J.P.Williams, A.Miotello, G.Lodato and A. Emsen-huber 2019 Constraining disk evolution prescriptions of planet population synthesis models with observed disk masses and accretion rates Astrophys.

2. B.Ercolano, I.Pascucci 2017. The dispersal of planet-forming discs: theory confronts observations. R. Soc. open sci. 4: 170114
3. Lada CJ, Wilking BA. 1984. The nature of the embedded population in the Rho Ophiuchi dark cloud—mid-infrared observations. Astrophys.
4. Sallum S. et al. 2015. Accreting protoplanets in the LkCa 15 transition disk. Nature
5. Ribas Á, Merín B, Bouy H, Maud LT. 2014. Disk evolution in the solar neighborhood. I. Disk frequencies from 1 to 100 Myr. Astron. Astrophys.
6. Currie T, Kenyon SJ, Balog Z, Rieke G, Bragg A, Bromley B. 2008. The rise and fall of debris disks: MIPS observations of h and χ Persei and the evolution of mid-IR emission from planet formation. Astrophys.
7. Picogna, G., Ercolano, B., Owen, J. E., et al. 2019, MNRAS, 487, 691
8. J.A.Khotamov, A.Kurbanov, B.Jurayev. Cases of inconsistency of observational results with theoretical models in explaining the evolution of planet-forming disks. Jizakh. 2020.