

Glossary of Terms

Accretion

The process of amassing material. Can refer to the movement of material from a young disk to its parent star, or to the movement of material from the disk to a forming planet.

ALMA

The Atacama Large Millimeter Array. A millimeter aperture synthesis telescope (interferometer) being constructed in the Chilean desert. Will eventually be the largest of its kind.

Astronomical Unit (AU)

The distance between the Earth and the Sun. 1.5×10^{11} m

CTTS

A classical T Tauri star- a young, low mass ($< \sim 2.5 M_{\text{solar}}$) star with a disk and H-alpha equivalent width > 10 Angstrom

Core Accretion

The currently accepted standard model for the formation of planets. It involves a series of collisions to form planetary cores, followed by inflow of gas. And to really confuse you, this is sometimes called core instability.

Forbidden Transitions

Refers to transitions that are not allowed according to the electric dipole approximation of an atom. These transitions are NOT actually forbidden, however; they just occur with less frequency than the dipole-permitted transitions. Therefore, these transitions are often indicative of low-density environments (the time between particle collisions must be small or else particles are collisionally de-excited). Forbidden lines are emitted in the bipolar jets ejected from young stars.

FU Ori Stars

Stars known for having large brightness variations. It has recently been suggested that these are young stars with disks that undergo large bursts of accretion onto the star. The related UX Orionis objects are similar in nature, but viewed close to edge-on.

Gravitational Instability

An alternative model for the formation of planets. It involves the spontaneous gravitational collapse of disk gas.

HR Diagram

A graph in which stars are plotted with luminosity as the y-axis and temperature (or color) as the x-axis. Hydrogen burning stars lie on a diagonal line called the Main Sequence. Young stars lie above the Main Sequence and drop towards the Main Sequence as they contract in size.

HST

The Hubble Space Telescope

Jeans Mass

The minimum mass required for gravitational collapse of a cloud.

magnitude

A standard measure of brightness in astronomy. A magnitude is defined as $m = m_0 - 2.5 \cdot \log(F/F_0)$ where m_0 and F_0 are the magnitude and flux of a reference star. Usually, the flux from Vega is defined to be a magnitude of zero. The larger the magnitude, the smaller the brightness.

Minimum Mass Solar Nebula (MMSN)

A model for the pre-solar nebula constructed by spreading out all of the solar system planets into a disk (after a correction for volatile loss).

Optical Depth

A (dimensionless!) measure of the amount of material encountered by a ray of light. Defined as the product of the number density (n), the effective cross-section of each particle (σ) and the path-length (l).

Optically thin/thick

Optically thick refers to material with optical depth $\gg 1$. Optically thin refers to material with optical depth < 1 .

Parsec

The distance at which a separation of 1 AU subtends an angle of 1 arcsecond in the sky. 206265 AU, 3×10^{16} m

PMS

Stands for Pre Main Sequence (ie a star that is too young to be on the Main Sequence of stellar evolution).

Poynting-Robertson Drag

A force on small particles in orbit around a star which causes their orbits to decay. (Wikipedia has some great diagrams if you want to understand the process).

Radiation Pressure

A force on small particles (effective for particles less than ~ 1 micron in size) that counteracts gravity, and can push the particles out of a protoplanetary system.

RV

Short for the Radial Velocity method of planet searching.

Spectral Energy Distribution (SED)

A plot of flux times wavelength against wavelength (or flux times frequency against frequency). SEDs are a key way to distinguish between a naked star and one with an accompanying disk, due to the latter's excess of emission in the infrared.

Stellar Type (O, B, A, F, G, K, M, L, T)

A way of classifying stars based on features in their spectra. Also correlates with effective temperature. As listed above, they are in order of decreasing temperature. Typical T Tauri stars are F,G, or K stars. Our sun is a G star.

Transitional disk

A disk for which the SED has a dip at near-Infrared through mid-Infrared wavelengths. Indicates that the disk doesn't have many small grains close to the star.

SMA

The SubMillimeter Array. A millimeter/submillimeter telescope (interferometer) on Mauna Kea, in Hawaii.

T Tauri Star (TTS)

A young, low mass (less than about 2.5 solar masses) star with a number of observational signatures of youth, including high lithium abundance (indicative of a star that hasn't been convecting for very long), forbidden emission lines (indicative of an outflow), H-alpha emission (indicative of accretion) and an infrared excess (indicative of a disk).

VLT

The ESO Very Large Telescope: see <http://www.eso.org/projects/vlt/>

wTTS

A weak line T Tauri star. Young, low-mass, but lacking significant H-alpha emission.

YSO

Stands for Young Stellar Object.