

b

RBW

Weak supersonic stellar wind

Shocked stellar wind

Shocked sub-shell

Radiatively braked sub-shell

supersonic stream

Stellar photons

Gas pressure

Density

n_2

n_1

n_0

n_∞

to star

$h_a \approx 0.22 R_{**}$

d_{cool}

km/s

30

20

10

Ballistic approximation

v_0

v_1

v_2

Sound speed

$-Velocity$

v_∞

R_{**}

$1.27 R_{**}$

Radius

The diagram illustrates the RBS model, showing the structure of a protoplanetary disk and the resulting velocity and sound speed profiles.

Top Panel: Disk Structure

- Weak supersonic stellar wind:** Indicated by a pink arrow pointing left towards the star.
- Shocked stellar wind:** A region of the stellar wind that has been shocked.
- Optically thick shell:** A central region of the disk where the optical depth is high.
- Gas pressure:** Indicated by a green arrow pointing into the shell.
- Density:** Indicated by a purple arrow pointing into the shell.
- Stellar photons:** Indicated by blue wavy arrows pointing into the shell.
- supersonic stream:** Indicated by a pink arrow pointing right away from the disk.
- Small leakage:** Indicated by a blue wavy arrow pointing right away from the disk.
- Parameters:** n_2 (top of shell), n_1 (middle of shell), n_0 (bottom of shell), n_∞ (far right), and $e^{-1}n_2$ (edge of shell).

Bottom Panel: Velocity and Sound Speed Profiles

- Y-axis:** km/s, ranging from 0 to 30.
- X-axis:** Radius, with R_* marked.
- to star:** Indicated by a pink arrow pointing left.
- Parameters:** $h_0 \approx 0.1 R_*$, $h_a \approx 2.7 h_0 / \tau$, and d_{cool} .
- Velocity Profile (red line):** Shows the velocity profile, with v_0 (top of shell), v_1 (middle of shell), v_2 (bottom of shell), and v_∞ (far right).
- Sound speed Profile (orange line):** Shows the sound speed profile, with v_0 (top of shell), v_1 (middle of shell), and v_2 (bottom of shell).