Epsilon Eridani has two asteroid belts

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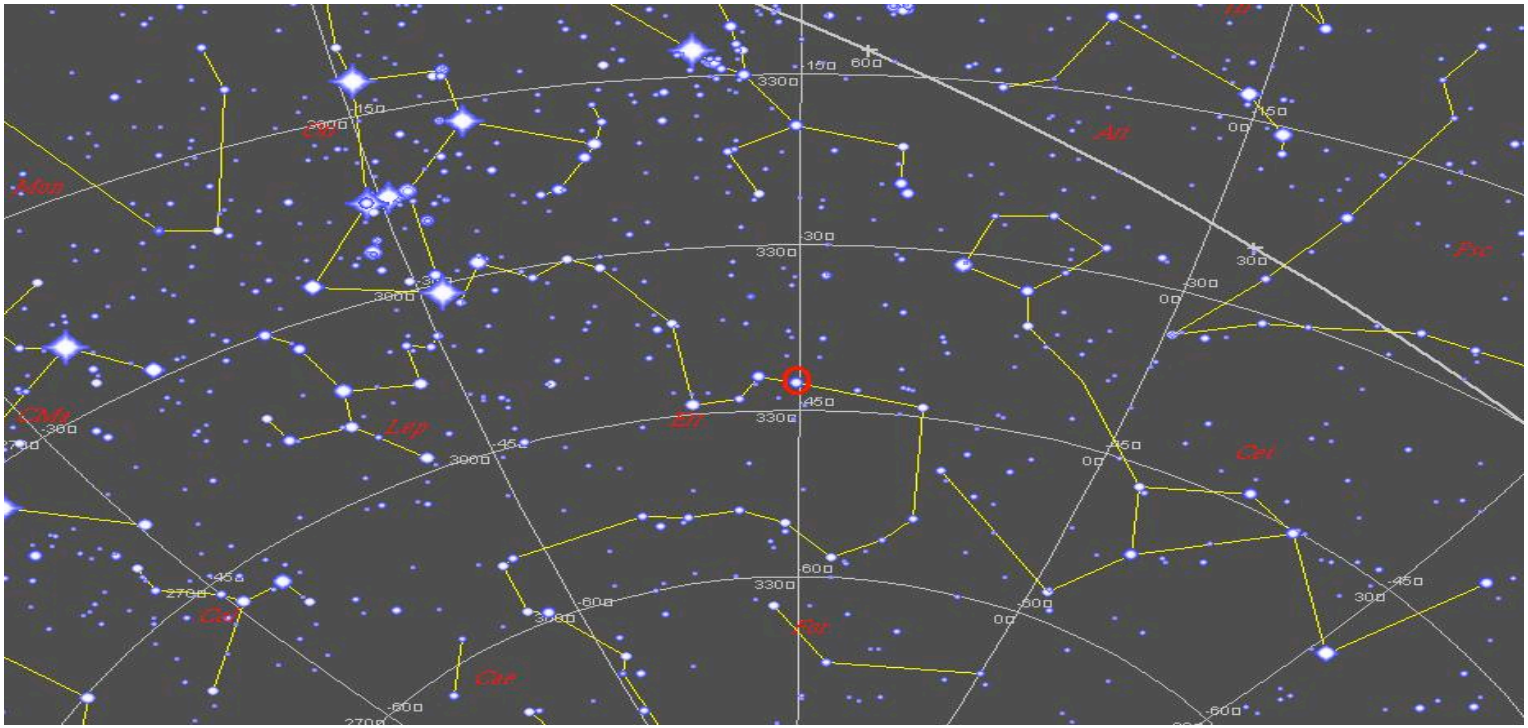
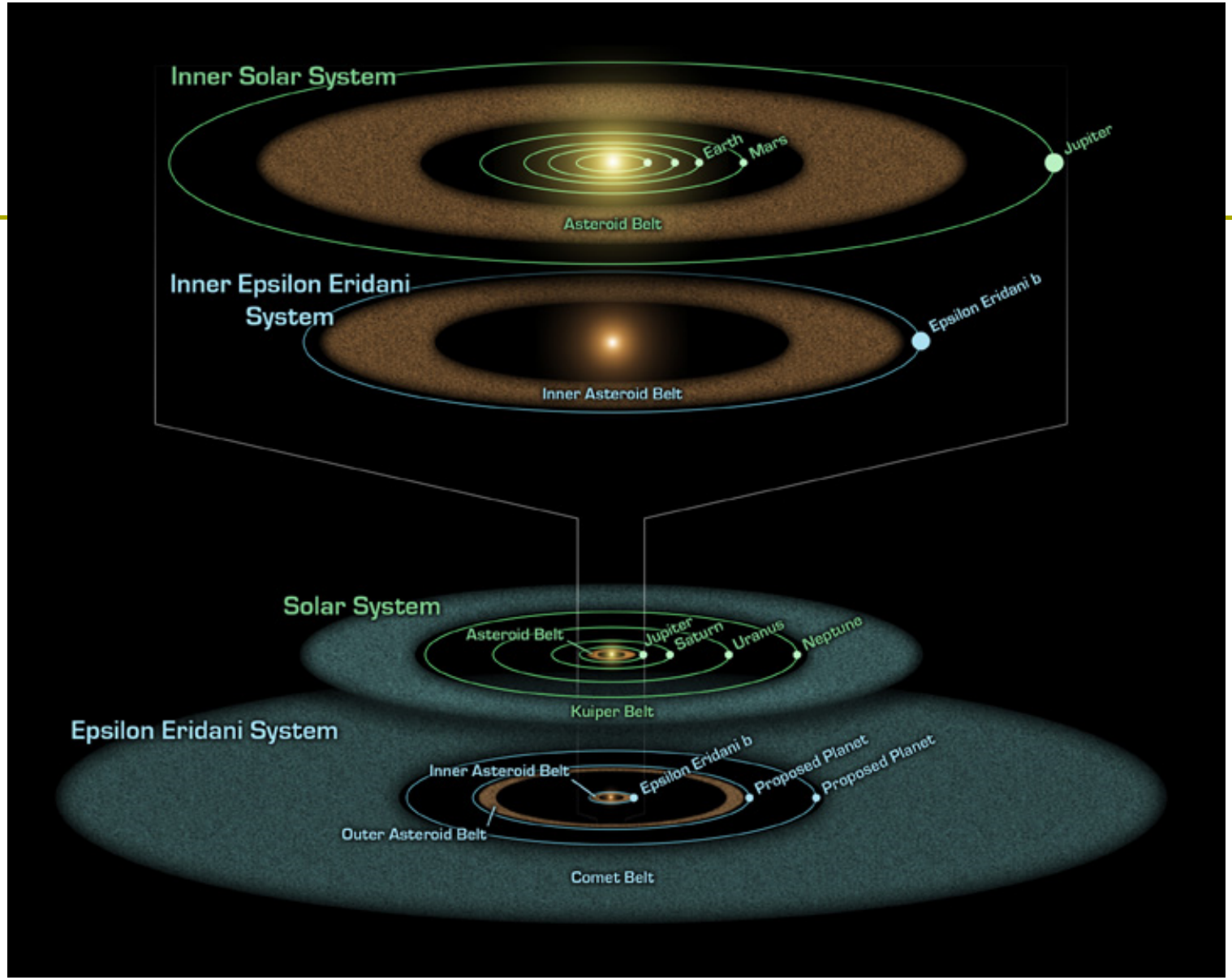
ε Eridani

- The nearby star ε Eridani has two rocky asteroid belts and an outer icy ring, making it a triple-ring system.



Epsilon Eridani

- Apparent magnitude 3.73
- Absolute magnitude 6.19
- Distance 10.5 ly (3.218 pc)
- Mass 0.85 $M_\odot$
- Radius 0.84 $R_\odot$
- Temperature 5073 K
- Luminosity 0.28 $L_\odot$
- Age 850 Myr



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from **http://www.astronomy.com/asy/objects/images/lores-1(1).jpg**

- *Spitzer*'s IRAC
  MIPS cameras,
  IRS
  MIPS SED-mode

  spectrophotometers
  SHARC II
- CSO's sub-millimeter telescope.

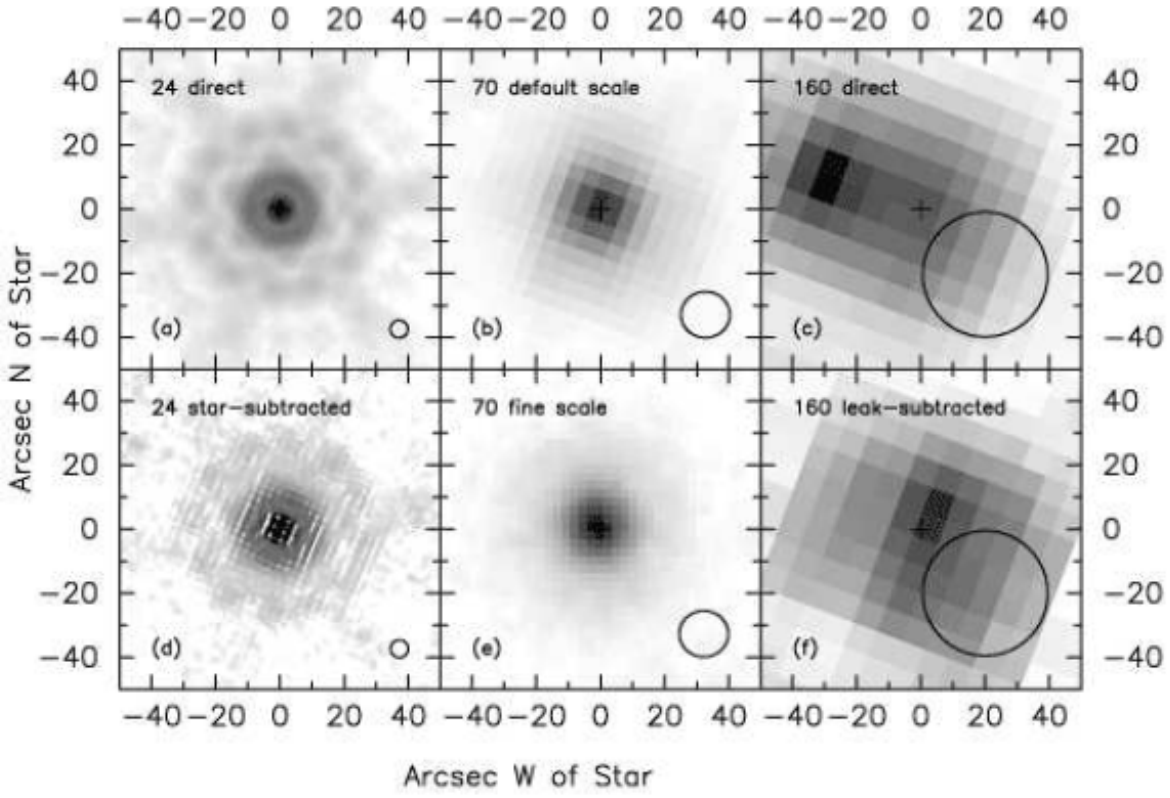

Fig. 1.— Images of ϵ Eri in the three *Spitzer* MIPS channels. N is up and E to the left in all the panels; $10'' = 32$ AU at ϵ Eri's distance. A cross marks the stellar position at the epoch of each observation, taking into account ϵ Eri's proper motion of $\sim 1''$ per year. Dark is positive. Circles indicate FWHM beam sizes. **The left column** shows 24 μm images in log stretch. These have been reconstructed from multiple dithered exposures and are oversampled by a factor of four. Panel (*a*) is the direct image, dominated by the stellar PSF. Panel (*d*) shows this image after subtracting a PSF reference star scaled to the photospheric flux density. The remaining excess (18% of the total 24 μm emission) appears largely as an unresolved point source. **The middle column** shows 70 μm images in linear stretch. Panel (*b*) is the default pixel-scale image used for photometric measurements, and panel (*e*) shows the fine pixel-scale image. **The right column** shows 160 μm images in linear stretch. Panel (*c*) is the direct image, and panel (*f*) shows this image after subtraction of the ghost image arising from the spectral leak.

- Spitzer data show gaps between each of the three rings surrounding Epsilon Eridani.

- "Planets are the easiest way to explain what we're seeing."

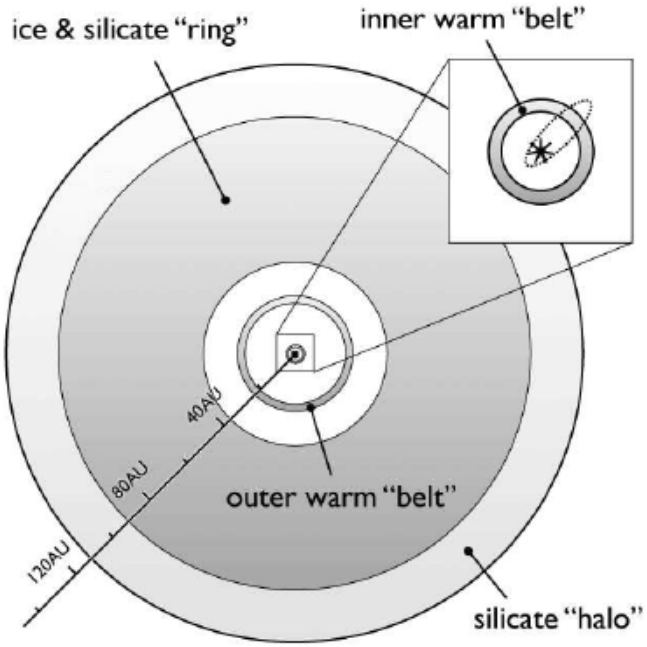

Fig. 9.— Representation of the ϵ Eri debris disk model components. The small-scale dotted ellipse is one solution for the orbit of the suggested radial velocity planet that appears to be inconsistent with the innermost warm debris belt's position.

Table 2. Model Components

component	r [AU]	$M_{\rm T}$ [$M_\oplus$]	α	a [μm]	x	f
W1	3	1.8×10^{-7}	–	3.0	–	3.3×10^{-5}
W2	20	2.0×10^{-5}	–	8.0	–	3.4×10^{-5}
RS	35–90	2.0×10^{-4}	+0.01	6.0–23	-3.5	3.0×10^{-5}
RL	35–90	4.2×10^{-3}	+1.05	100–200	-3.5	4.4×10^{-6}
HS	90–110	2.5×10^{-4}	+0.15	15-23	-3.5	4.8×10^{-6}

Note. — Columns: (1) model component: W1 = warm belt 1, W2 = warm belt 2, RS = sub-mm ring, small grains; RL = sub-mm ring, large grains; HS = halo, small grains; (2) location; (3) total mass; (4) mass surface density exponent, assumed to be zero for the W1 and W2 components, fitted to data for the other components; (5) grain radius; (6) assumed grain size distribution exponent; (7) fractional luminosity, L_d/L_*

Reference

- **Solar system's young twin has two asteroid belts**

  http://www.astronomy.com/asy/default.aspx?c=a&id=7556

- **Epsilon Eridani's Planetary Debris Disk: Structure and Dynamics based on Spitzer and CSO**

  arXiv:0810.4564v1 [astro-ph]

- Thank you