

Herschel PACS Observations of Stars with Warm Dust Emission



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We observed stars with known warm dust belts with Herschel to look for cold dust

Warm Dust

The dust in most debris disks is formed through a **collisional cascade** triggered by cometary collisions.

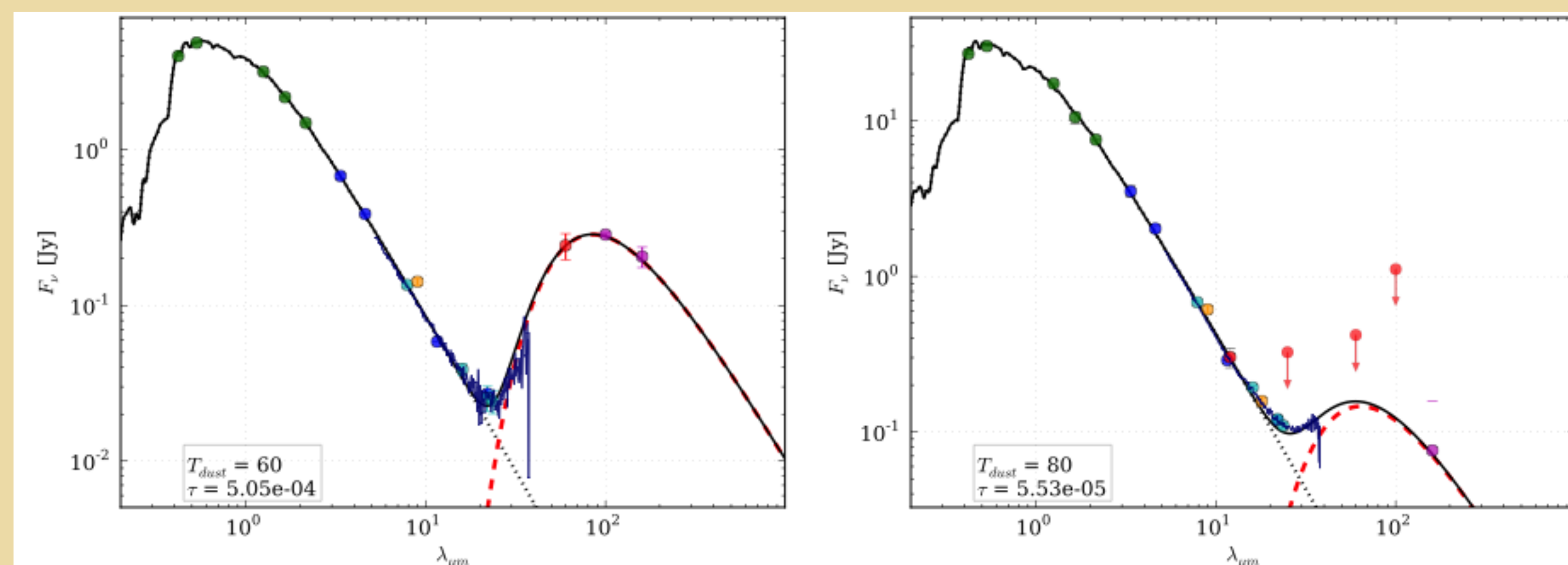
Cometary collisions should take place largely in a **cold outer belt**.

Warm inner belts are either due to **feeding by a cold belt**, or an alternate formation mechanism

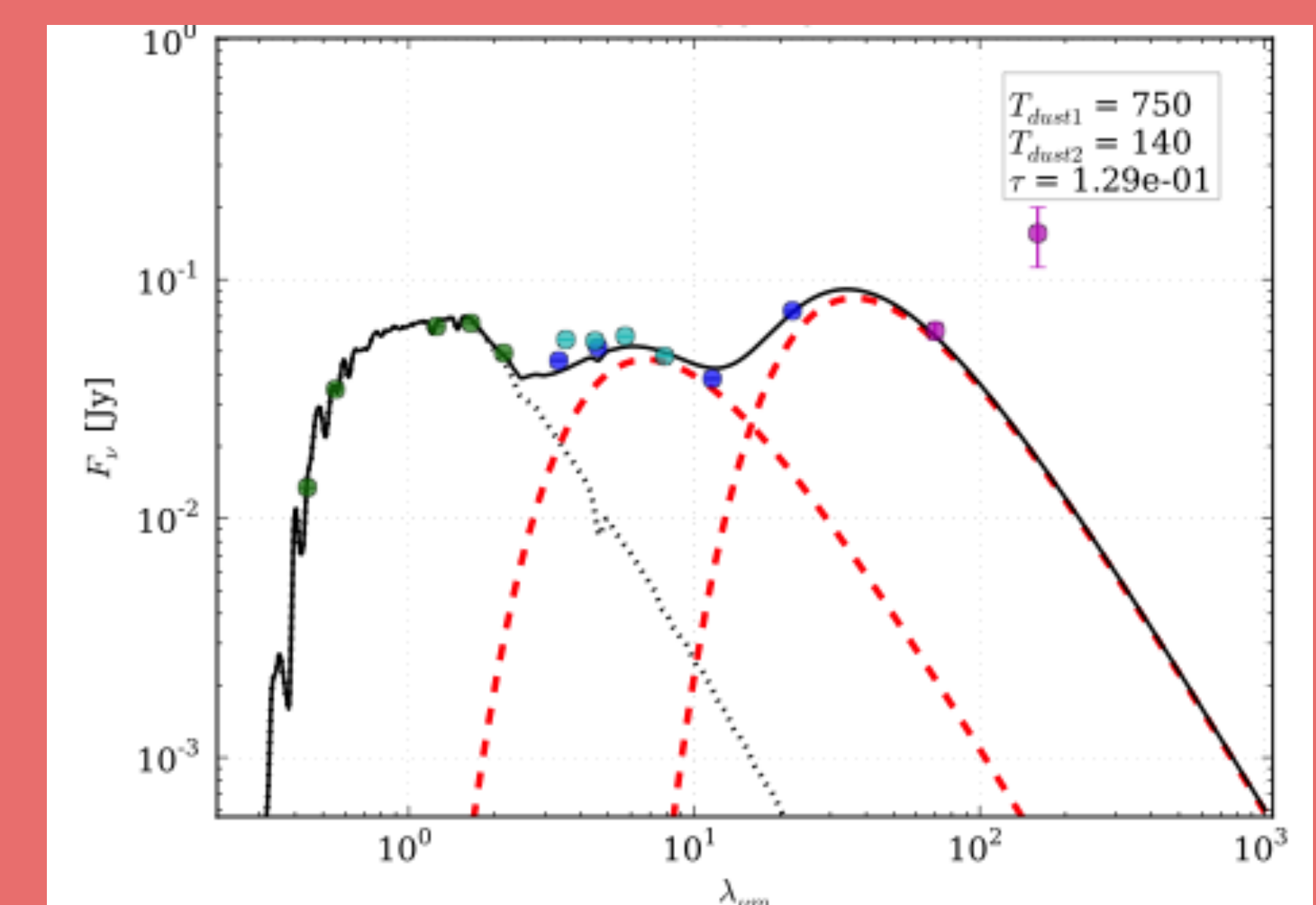
Why Herschel

Long wavelength data allows us to search for **cold dust components**.

If no cold component is found, the warm dust may be due to a **recent massive collision**.



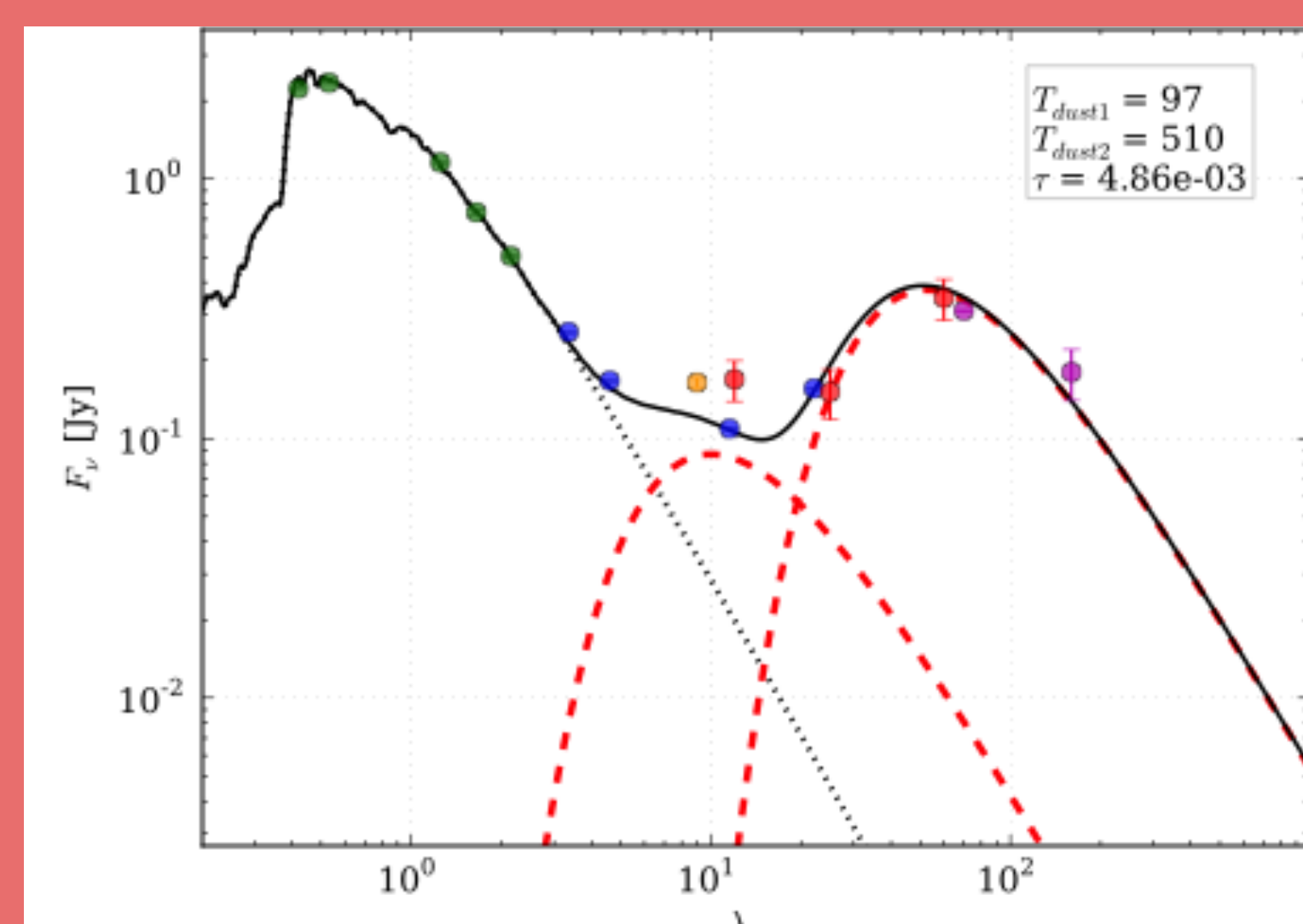
V488 Per



Long wavelength data allows for a better characterization of cold dust in orbit around V488 Per.

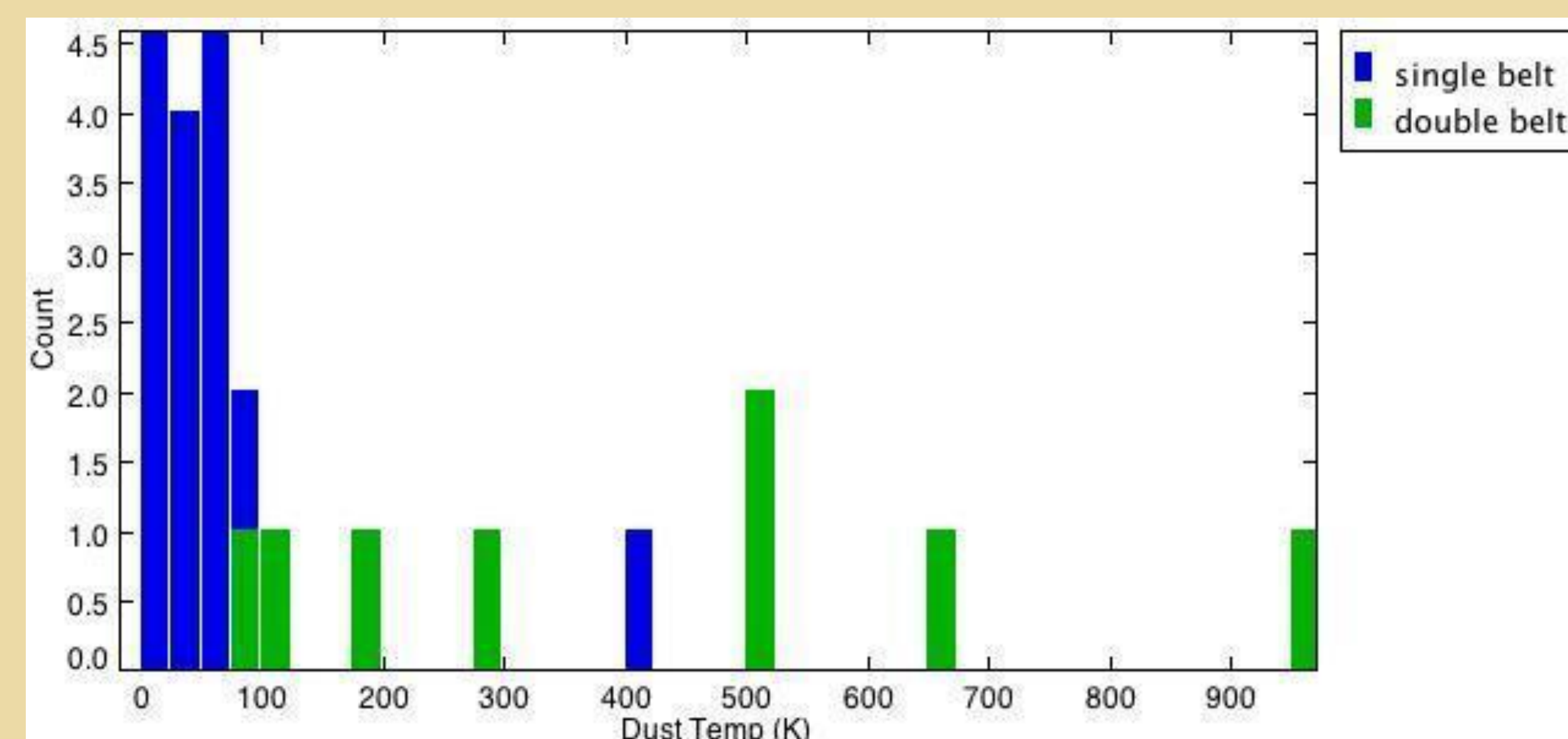
Of 23 stars observed with Herschel, 13 show evidence of a cold dust belt

Double Belt Systems



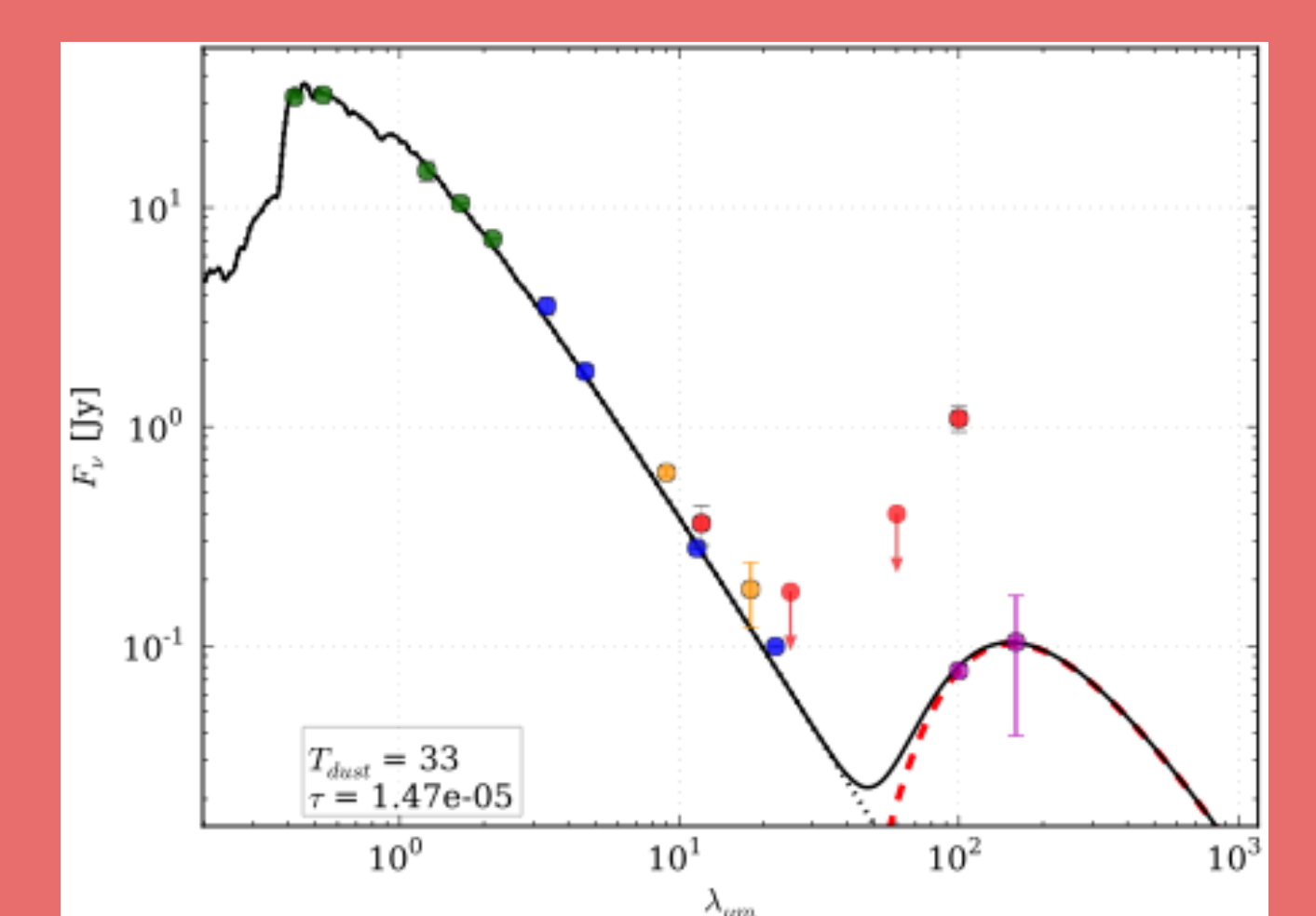
Dust created in comet collisions **spirals in due to PR drag**. When it reaches the inner disk, **radiation pressure takes over** and blows the grains out of the system.

Conclusions



1. Warm, single-belt systems are rare. (massive collisions in the terrestrial planet zone are also rare.)
2. Two-belt systems tend to have hotter inner belt temperatures than single-belt systems. ("feeding" mechanism delivers dust to the inner-most regions of the disk)

Future Work



- Several of our targets merit further processing and investigation.
- Our results will inform models of dust migration and the impact frequency of terrestrial planets.
- Stars with significant cold dust belts merit sub-mm follow-up with ALMA.

Warm single-belt systems (like BD+20 307) are rare!