高温ダスト銀河の観測
（南極10m版）

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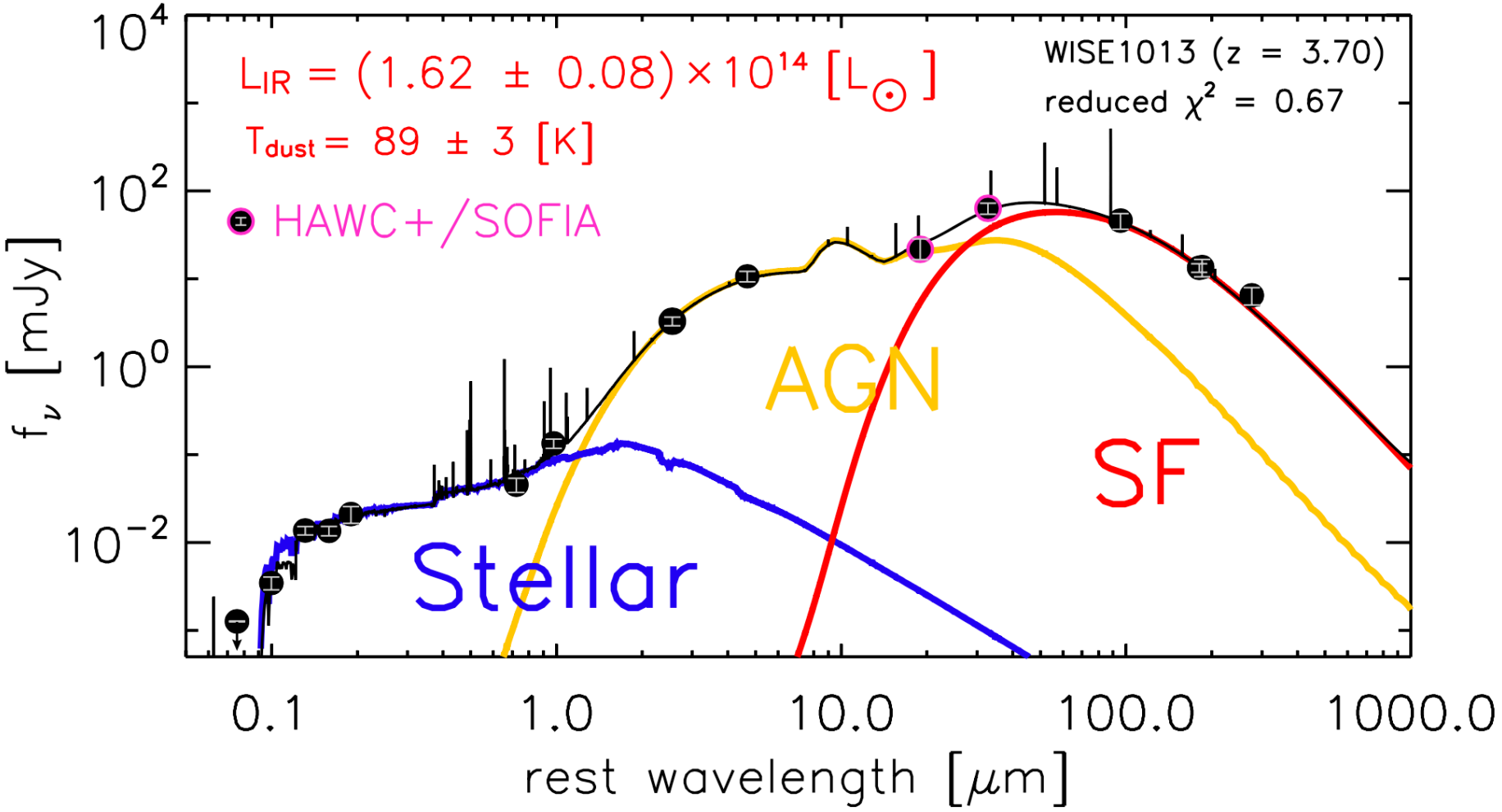
ELIRG: WISE 1013+6112

Toba et al. (2020)



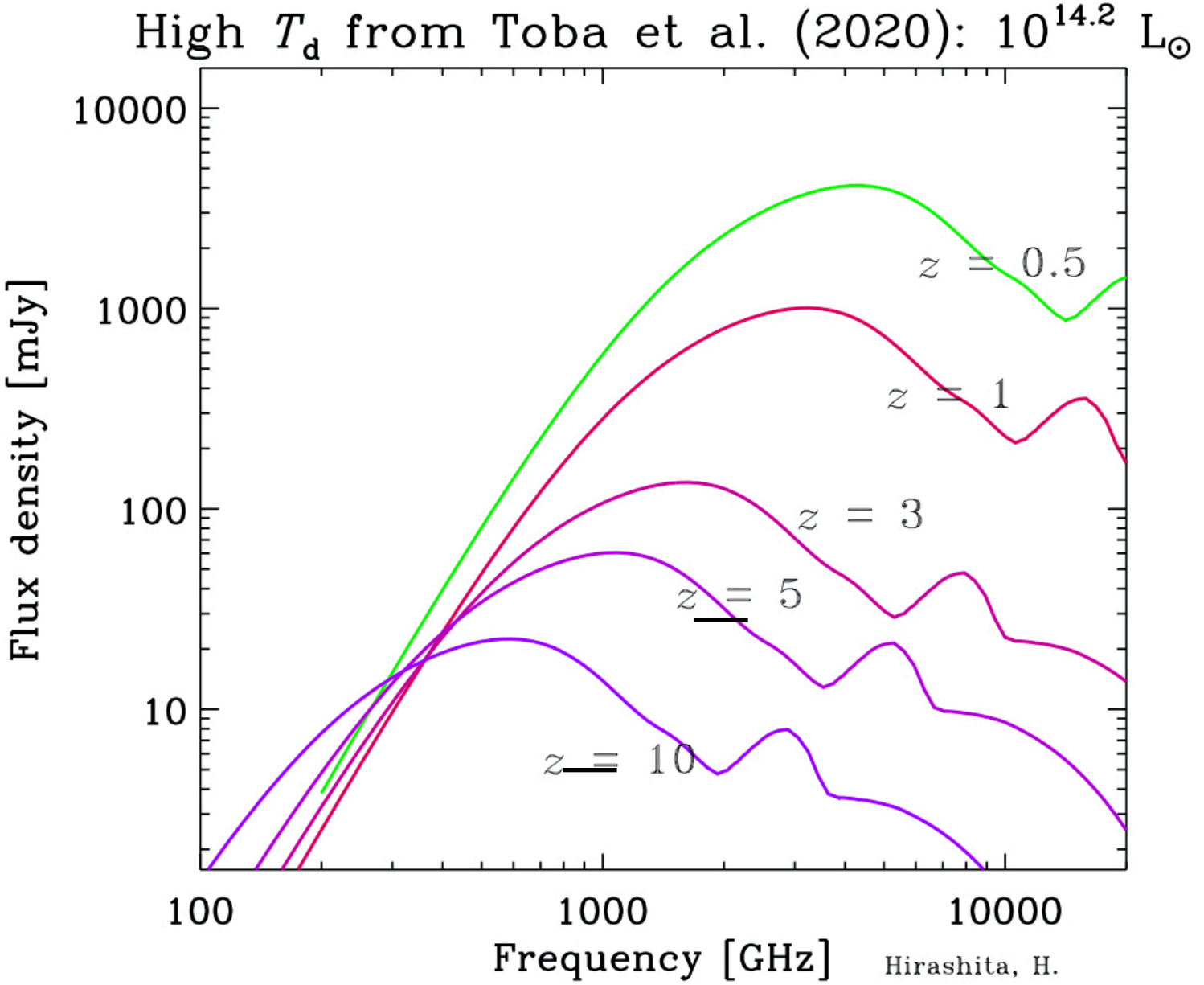
"Hot DOGs"

Two Science Cases

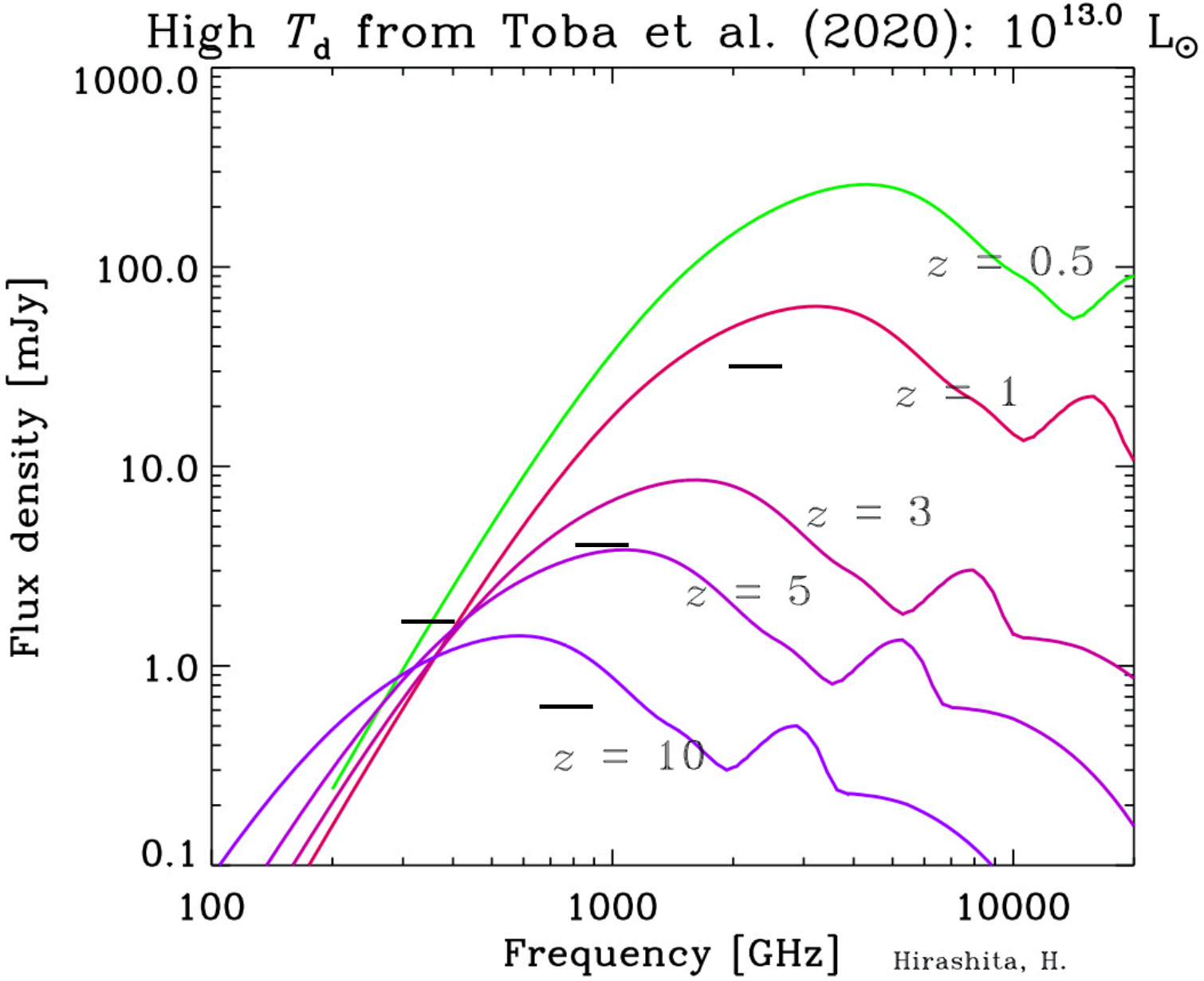
(1) High-$T_{\rm dust}$ IR-luminous galaxies.
(2) High-$T_{\rm dust}$ galaxy populations at high redshift.

We use WISE 1013+6112 for the SED template.

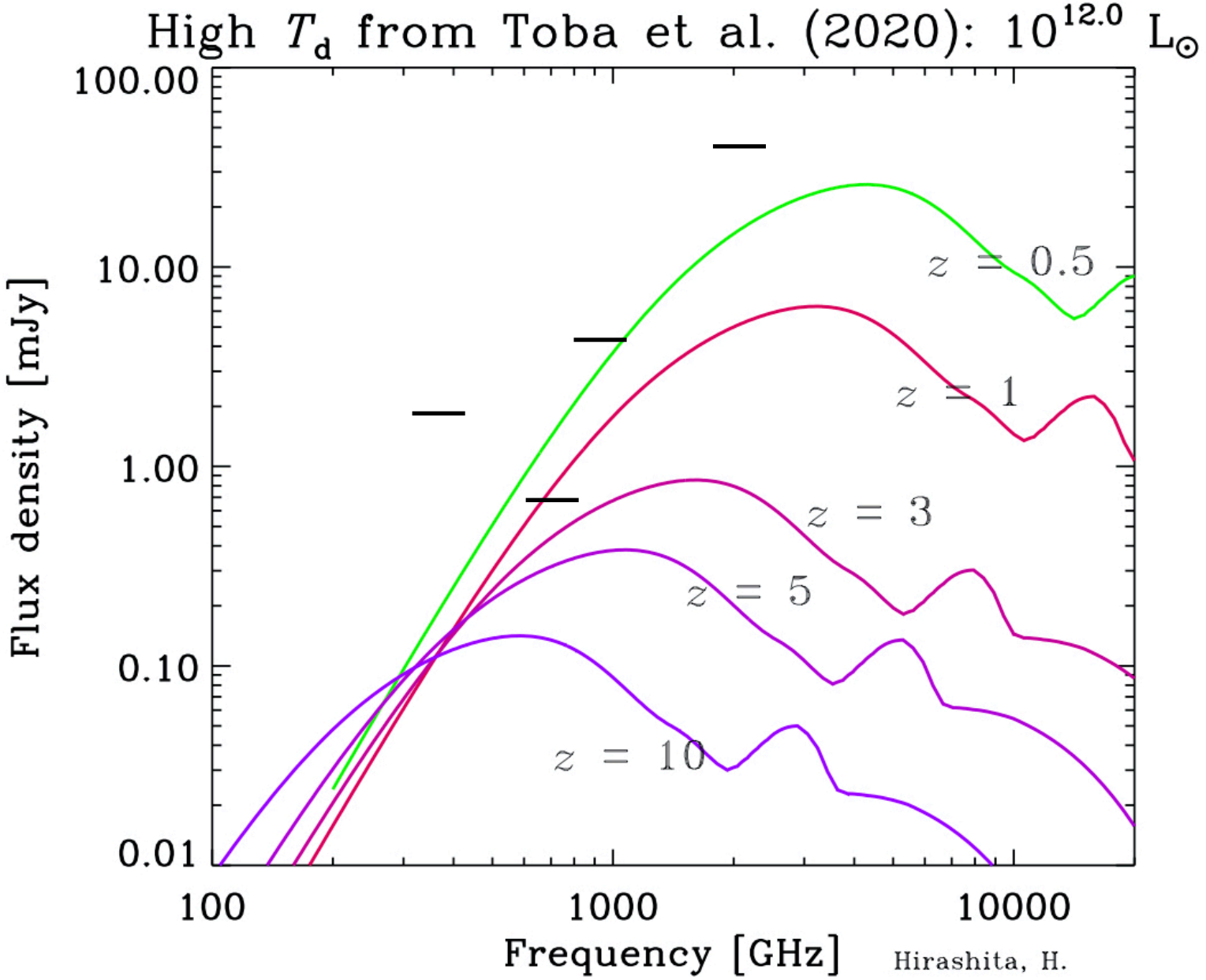
WISE 1013+6112 at Various z



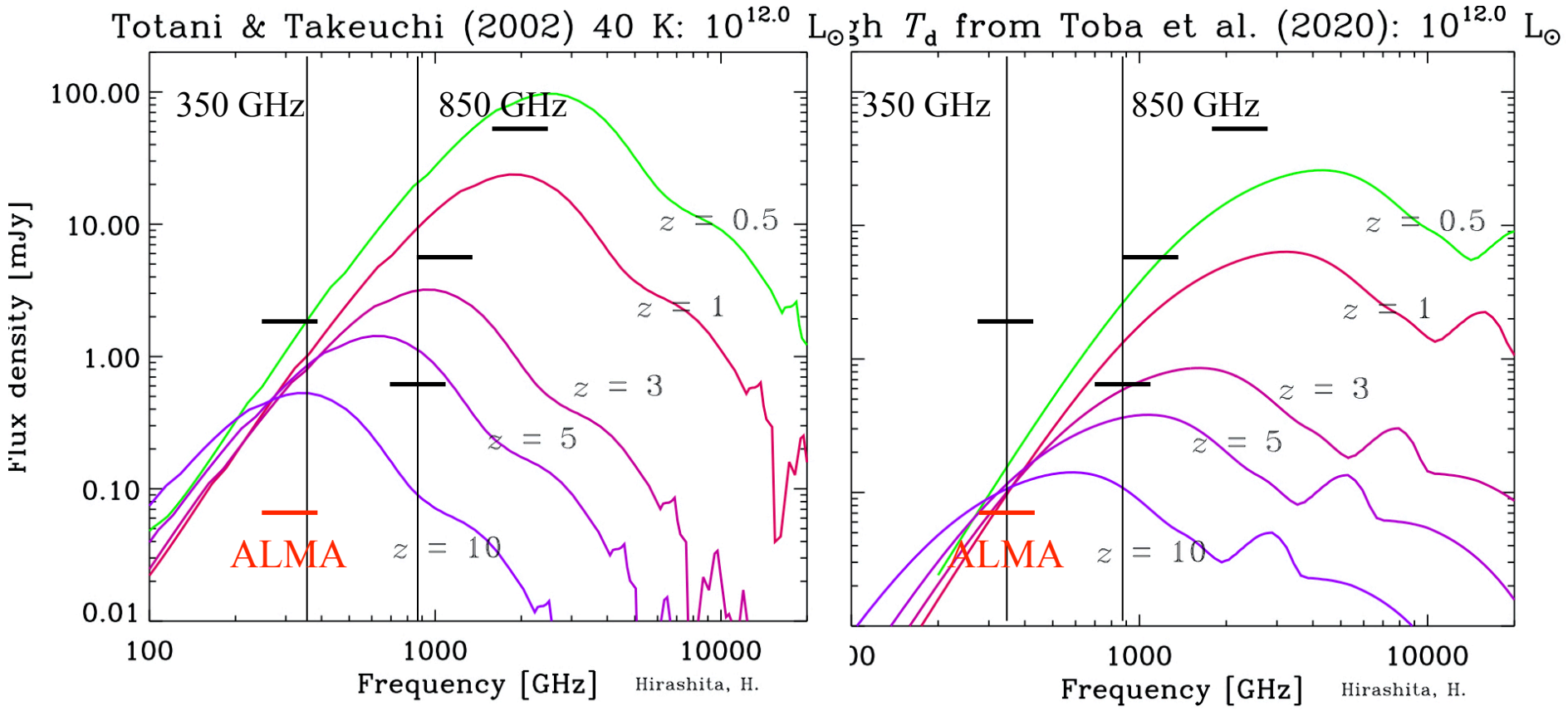
WISE 1013+6112-like SED with 10^{13} $L_\odot$



WISE 1013+6112-like SED with 10^{12} $L_\odot$



Usual Starburst vs. High Td Galaxy



Sub-THz (e.g., 850 GHz) is crucial not to miss high-temperature objects (at $z \lesssim 3$).

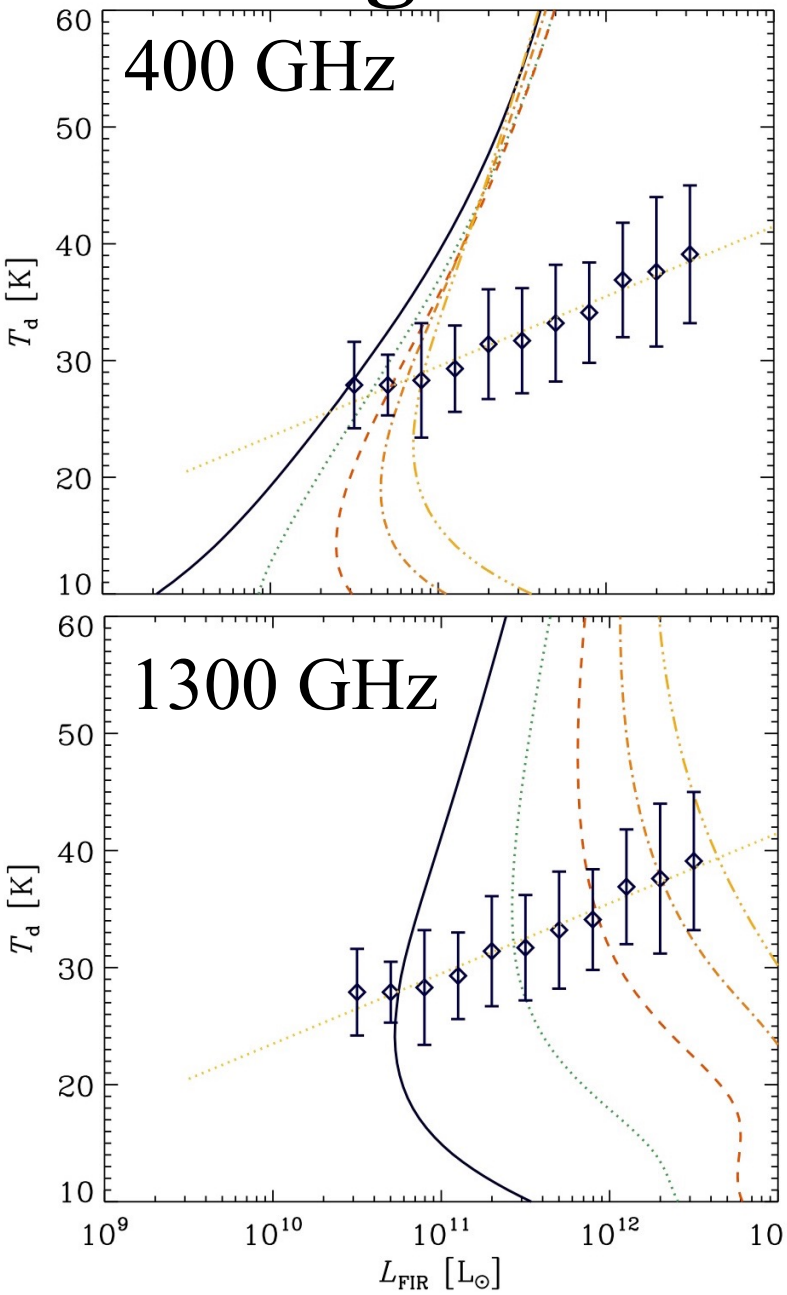
Summary

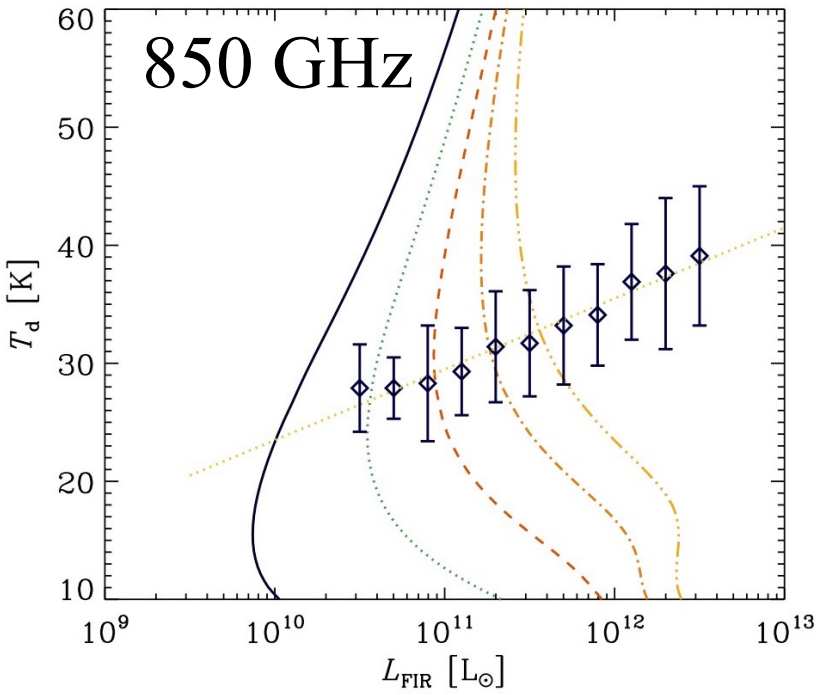
(1) High-$T_{\rm dust}$ IR-luminous galaxies.
- THz bands are useful to follow up very luminous high-temperature objects.
- THz bands are useful to determine the dust temperature for starburst galaxies.

(2) High-$T_{\rm dust}$ galaxy populations at high redshift.
- sub-THz surveys are useful to correctly catch high-temperature objects (often used 350 GHz is biased against such objects) up to $z \lesssim 3$ for the 10 m telescope.
- Remark: Not confusion limited (350 GHz reaches the confusion limit easily).

Thank you.

At High Redshifts with Sensitivities





Data: Symeonidis et al. (2013)
Herschel ($z \sim 0$–1)
Lines: z = 1, 2, 3, 4, 5

High-frequency bands are relatively unbiased to the dust temperature.

Merits/Demerits of FIR–Submm

(1) SED is simple: $I_\nu = C\nu^\beta B_\nu(T_{\rm dust})$

(+) photometries at a few wavelengths are enough

(-) very limited information on dust material (β)

(2) Depends on $\boldsymbol{T_{\rm dust}}$ (determines the peak wavelength)

(+) good tracer of the interstellar radiation field

(-) observation at a single wavelength is not enough

(3) grain size $<<$ λ in FIR–submm $\Rightarrow$ mass absorption coefficient is independent of grain size

(-) no information on the grain size

(+) good tracer of **total dust mass**