

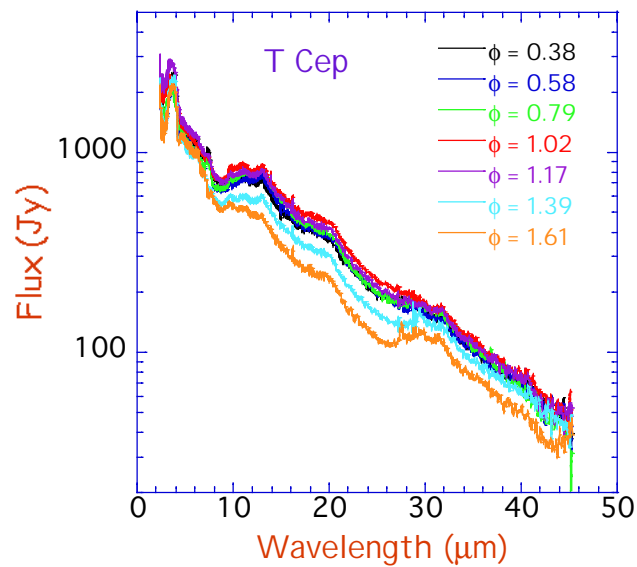


# シリケートダストバンドの変光

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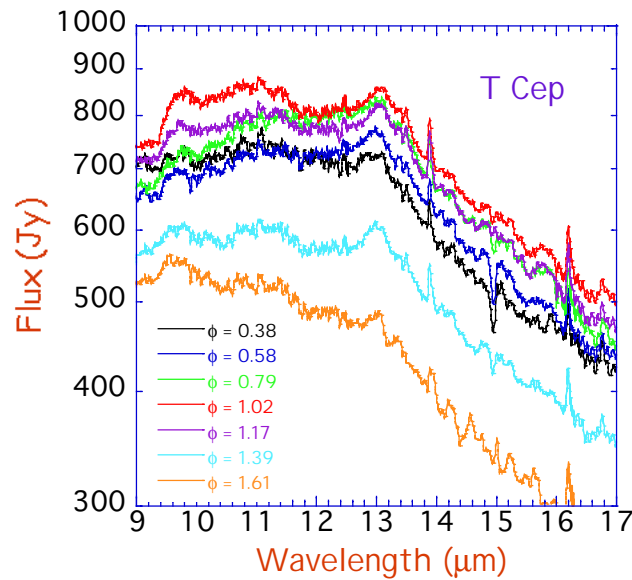


## Time Variation of T Cep





## T Cep in 10 $\mu\text{m}$ Region



## Summary of T Cep



### Variability

small, but complex  
not synchronized with visual light curve

Molecular features:

$\text{CO}_2$ ,  $\text{SO}_2$ ,  $\text{H}_2\text{O}$ ...

Dust features:

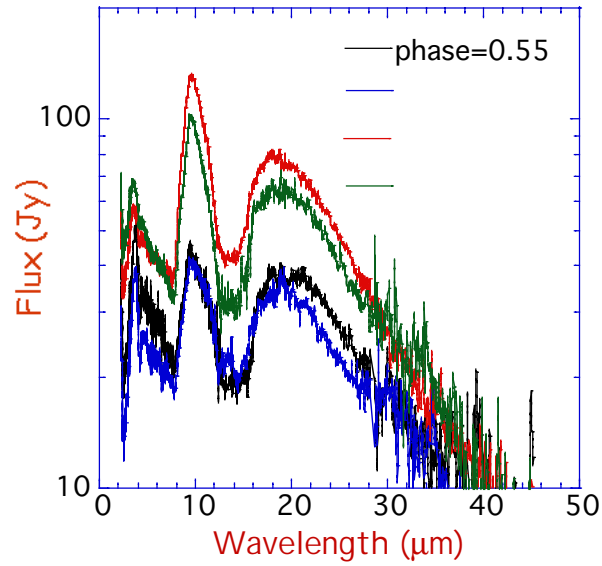
13 $\mu\text{m}$  band

28-32  $\mu\text{m}$  band FeSi?

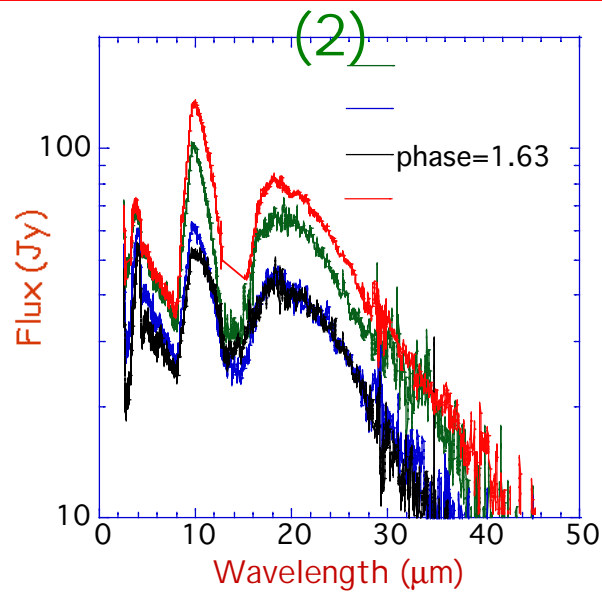
Decrease in continuum  $\leftarrow$  T-dependence?



## SWS Spectra of Z Cyg (1)



## SWS Spectra of Z Cyg





## Summary of Z Cyg



Observed large variation in MI R spectra  
<--- results from stellar light variation

Observed  $\Delta L$ ,  $\Delta T(\text{dust})$   $\rightarrow$   $T_m$  &  $Q(\lambda)$

$$T_m = 800 - 900 \text{ K}$$
$$Q(20\mu\text{m})/Q(10\mu\text{m}) \sim 0.65$$

MI R spectral variation  $\rightarrow$  optical properties



## Summary



Variability in MI R spectra of M-type Miras  
A large variety ( $\sim 10 \mu\text{m}$  feature)

Variability observations



dust formation/properties  
properties of extended atmosphere

Observations of various objects  
in a wide spectral range  $7-30 \mu\text{m}$