Report on the International Training in Tenerife

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(Astronomical Institute)

GP-PU Progress Status Presentation

— Spring 2019 —

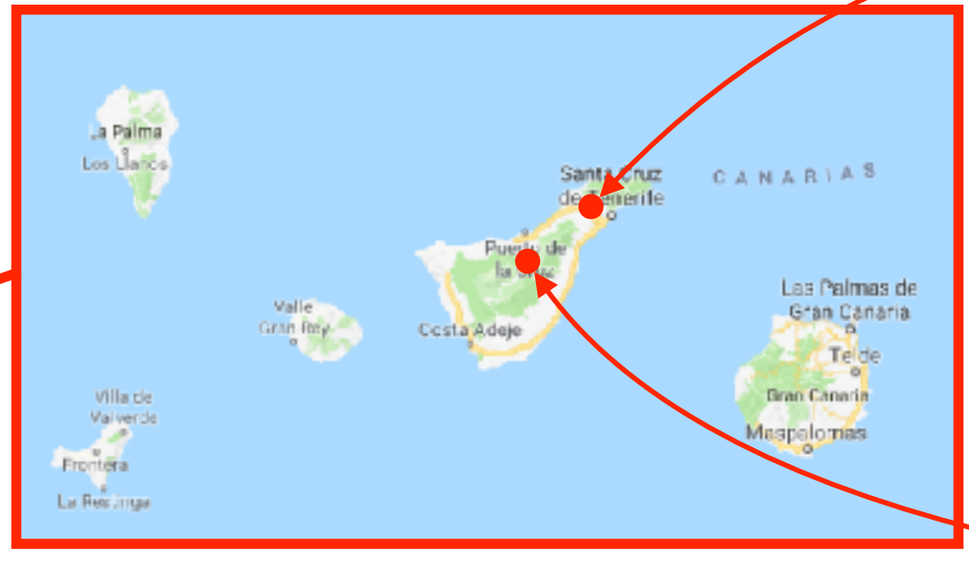
International Training

Date : 4 September - 18 December 2018

Place : Instituto de Astrofísica de Canarias
Tenerife island, Spain

IAC

Canary Islands



Teide Observatory

International Training

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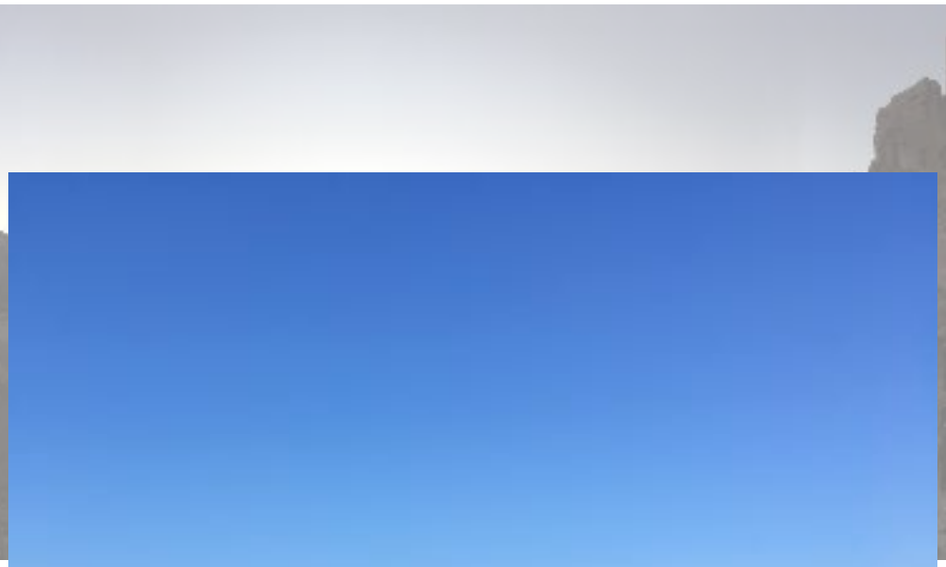

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tional T

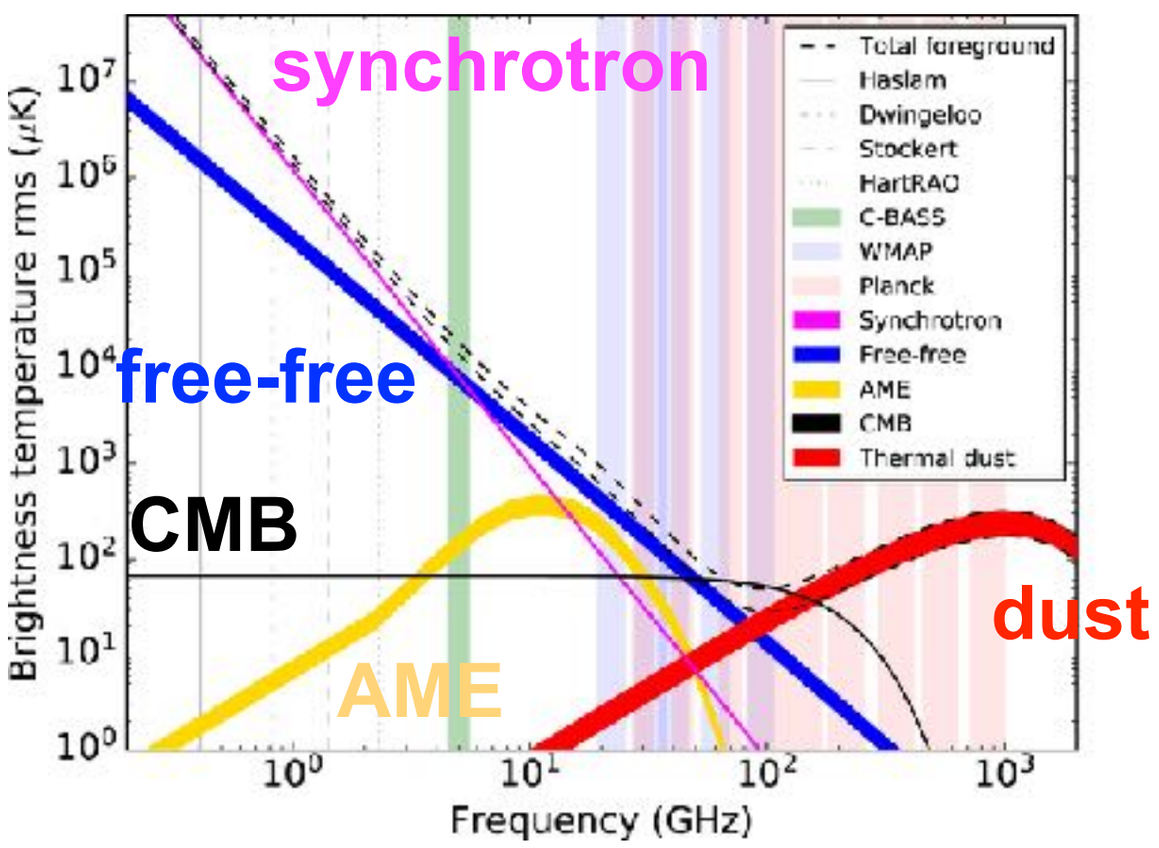
I enjoyed Tenerife life!

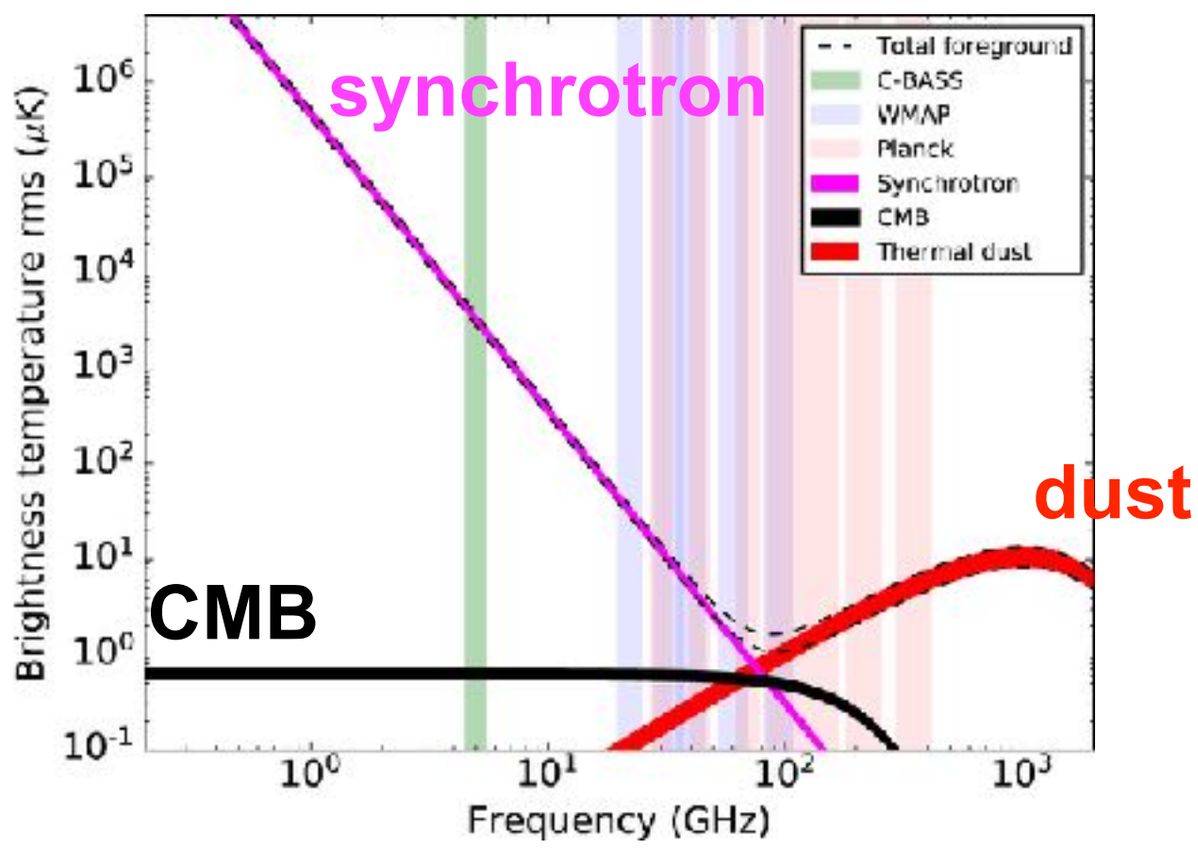
Anomalous Microwave Emission

AME is a component of diffuse Galactic radiation observed at frequencies in the range ~10-60GHz.

Polarized AME has not detected yet.

The origin of AME is unknown.





Jones+ (2018)

Purpose of My Staying in Tenerife

Candidates of the AME Source

- spinning dust emission
- magnetic dipole emission
- thermal emission from amorphous dust

↓

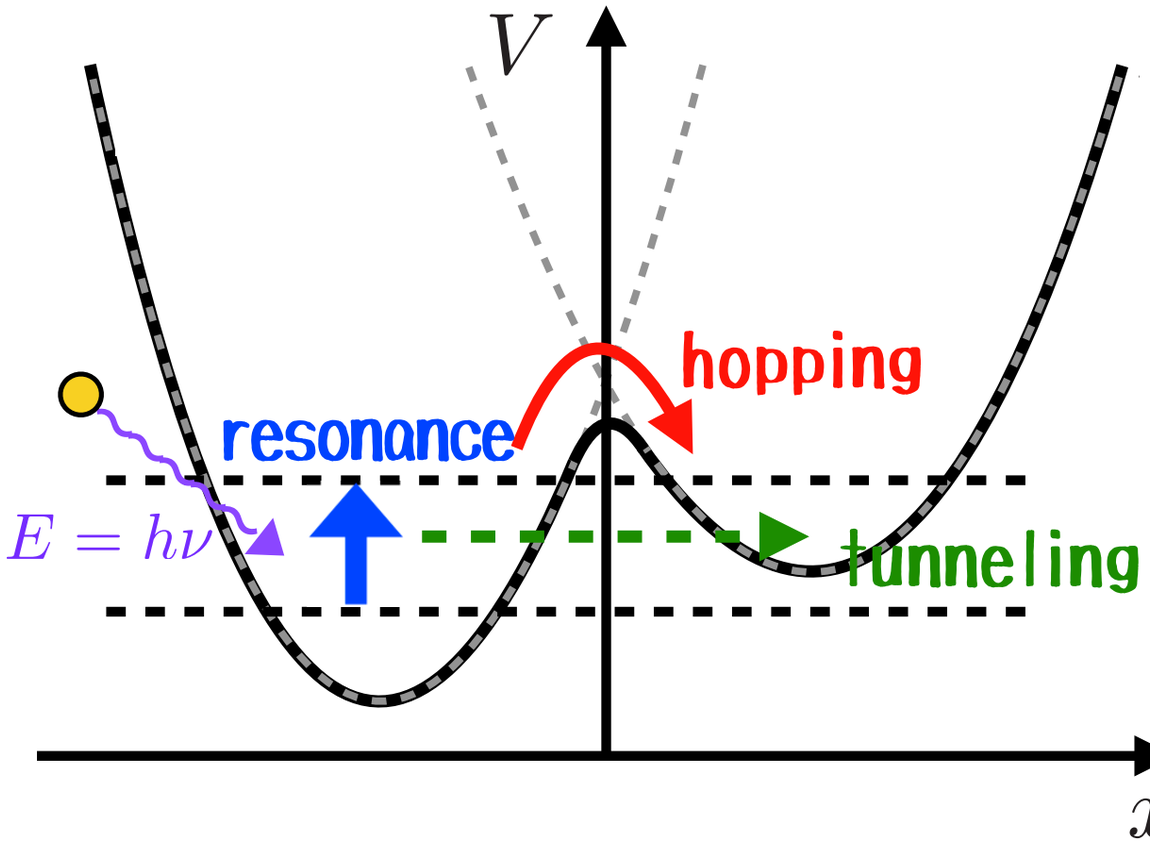
the relation between AME and the physical mechanism of amorphous dust emission has not been studied yet

↓

we studied whether the amorphous dust model is able to explain diagnostics of whole frequency range spectrum provided by QUIJOTE and other ancillary experiments.

Amorphous Dust Emission

Two-Level Systems model



at higher temperature
--> absorption is dominated by relaxation processes
- phonon assisted tunneling
- hopping over the barrier

at low temperature
--> - resonant absorption

AME?

energy difference ~ 1K ~ 10GHz

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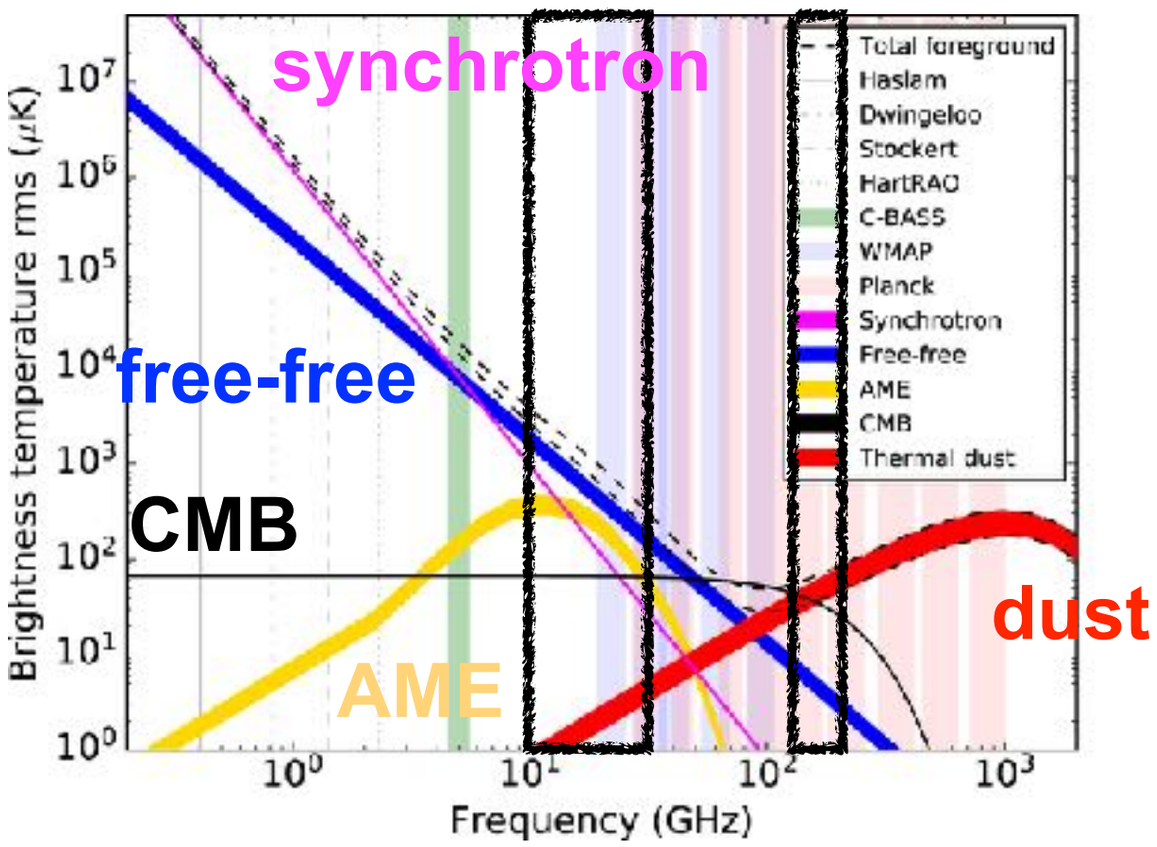
Q-U-I JOint Tenerife Experiment

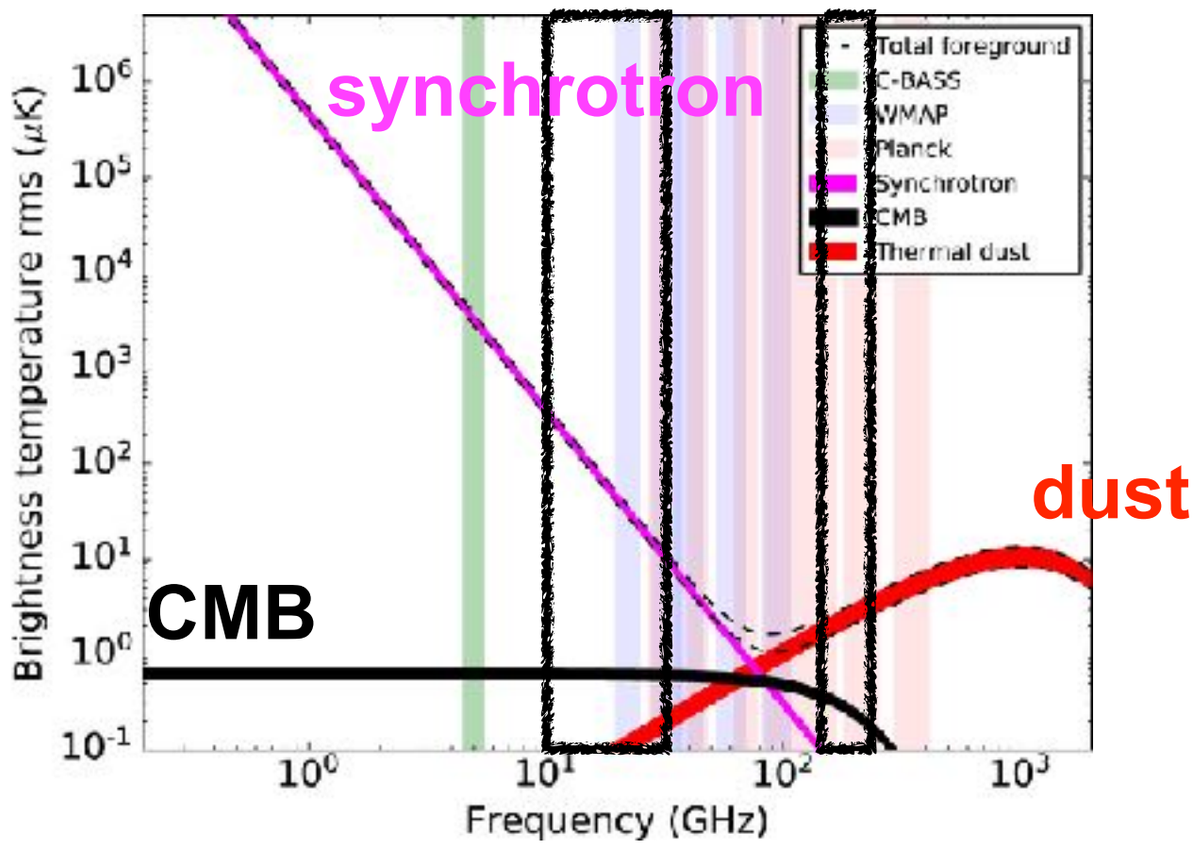
QUIJOTE is an observational experiment operating in the microwave range.

—> QUIJOTE provides information about AME

QUIJOTE GroundBIRD



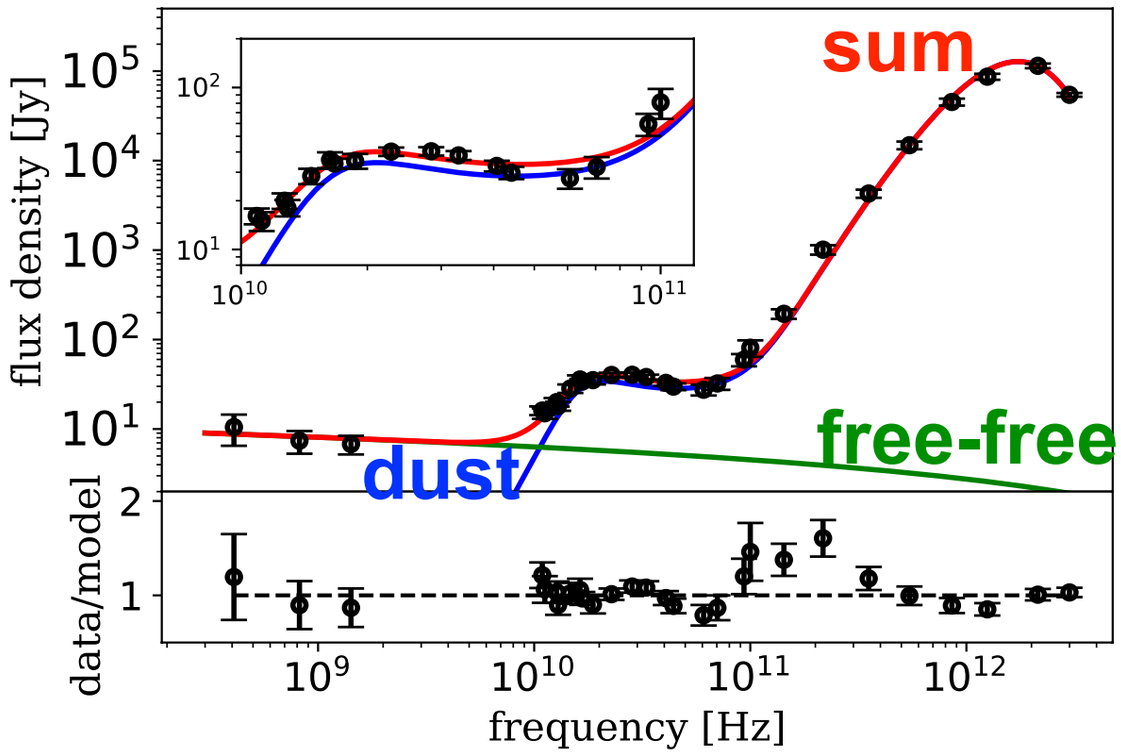
QUIJOTE GroundBIRD



Jones+ (2018)

Amorphous Dust & AME

Perseus MC



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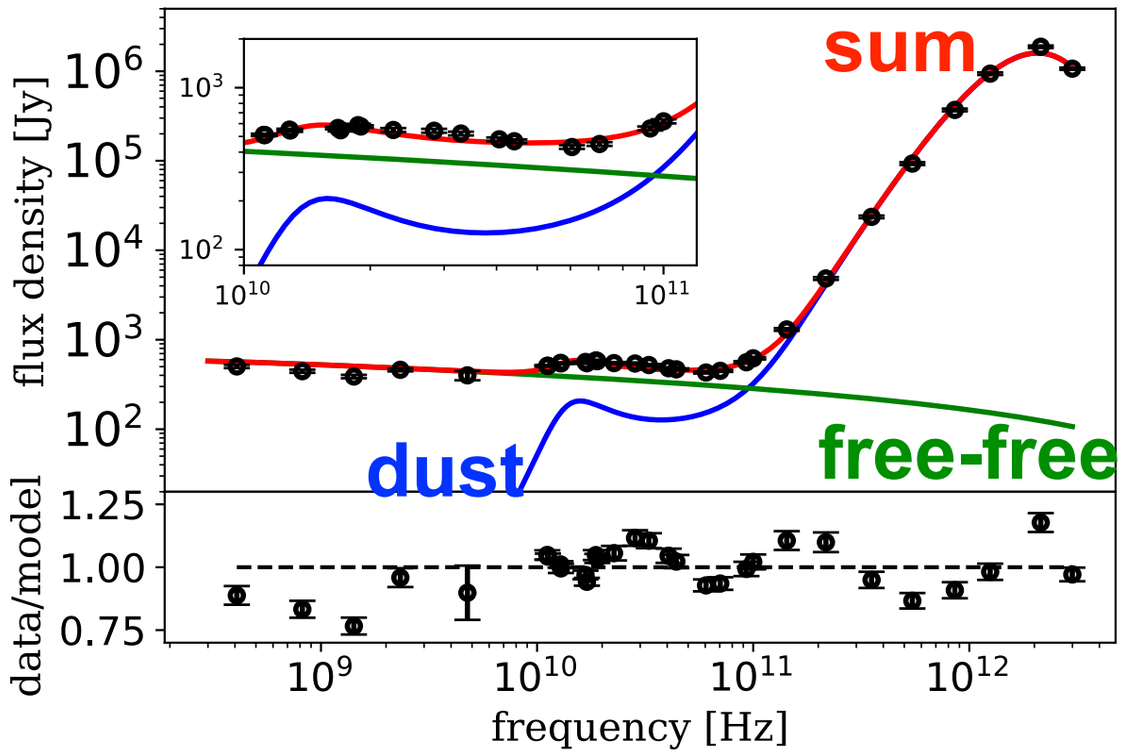
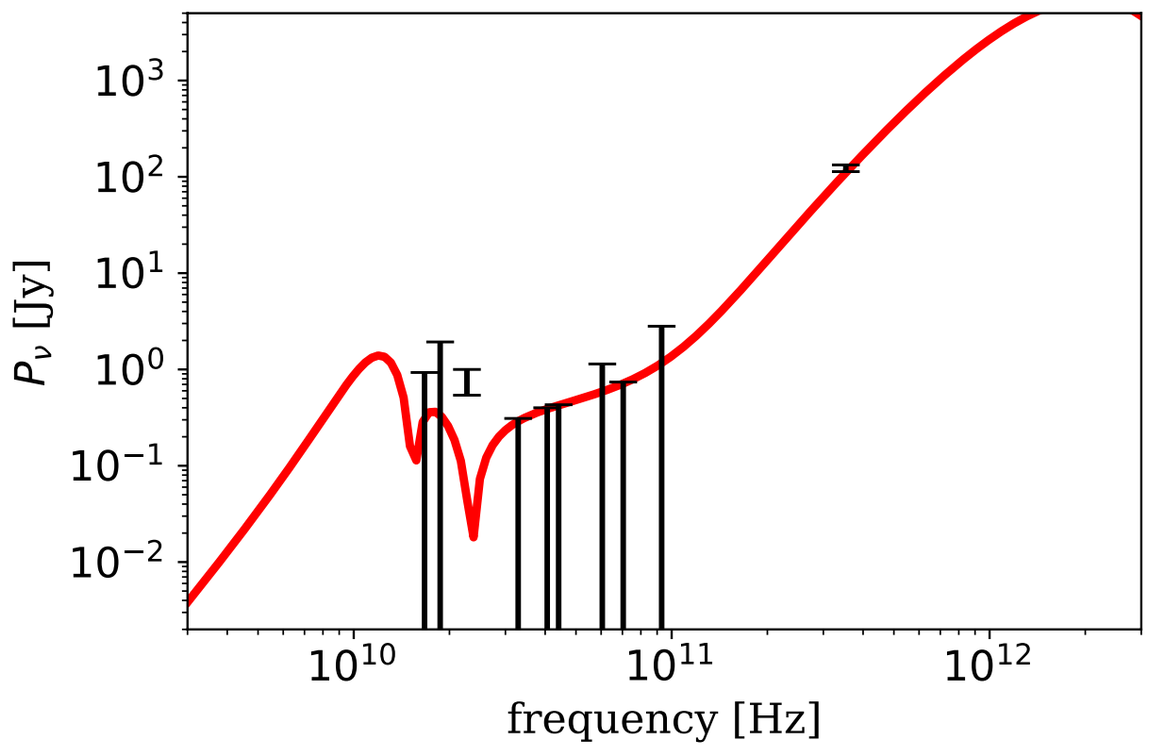


Our model provides consistent results both with intensity and polarization SEDs



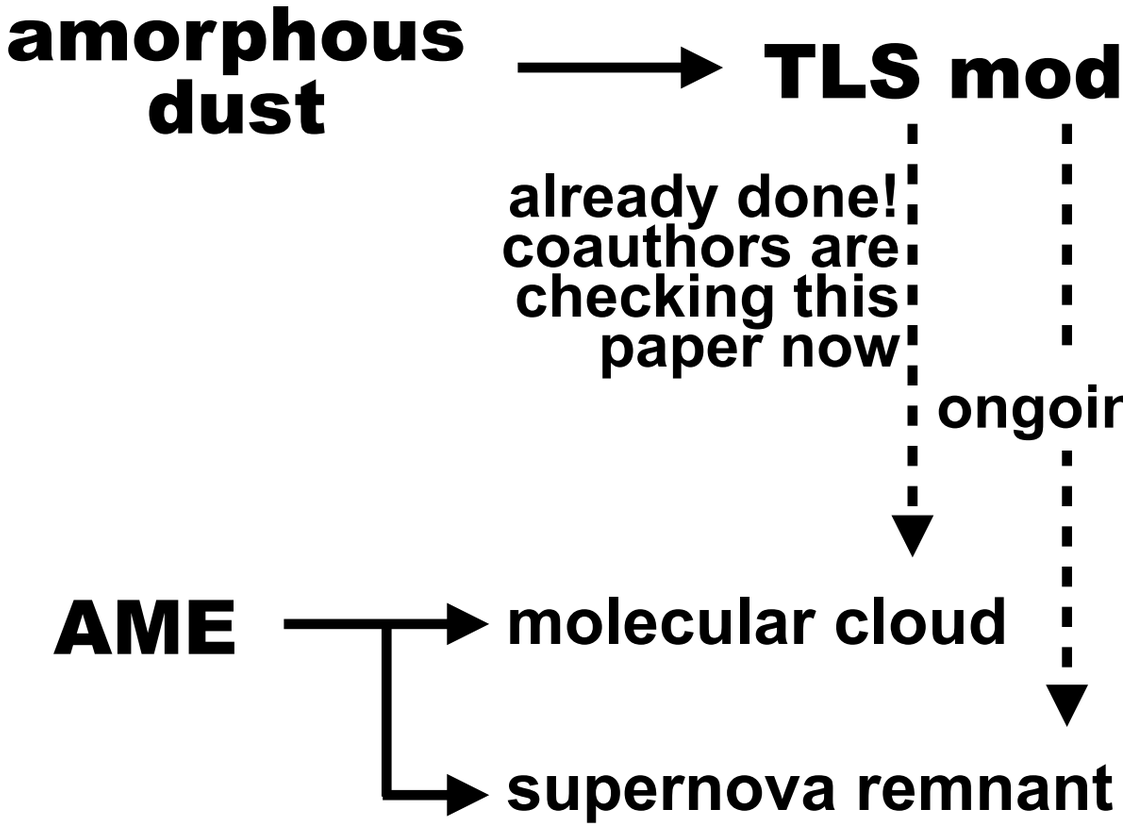
Study Strategy

amorphous dust → TLS model

already done! coauthors are checking this paper now

AME → molecular cloud

Study Strategy



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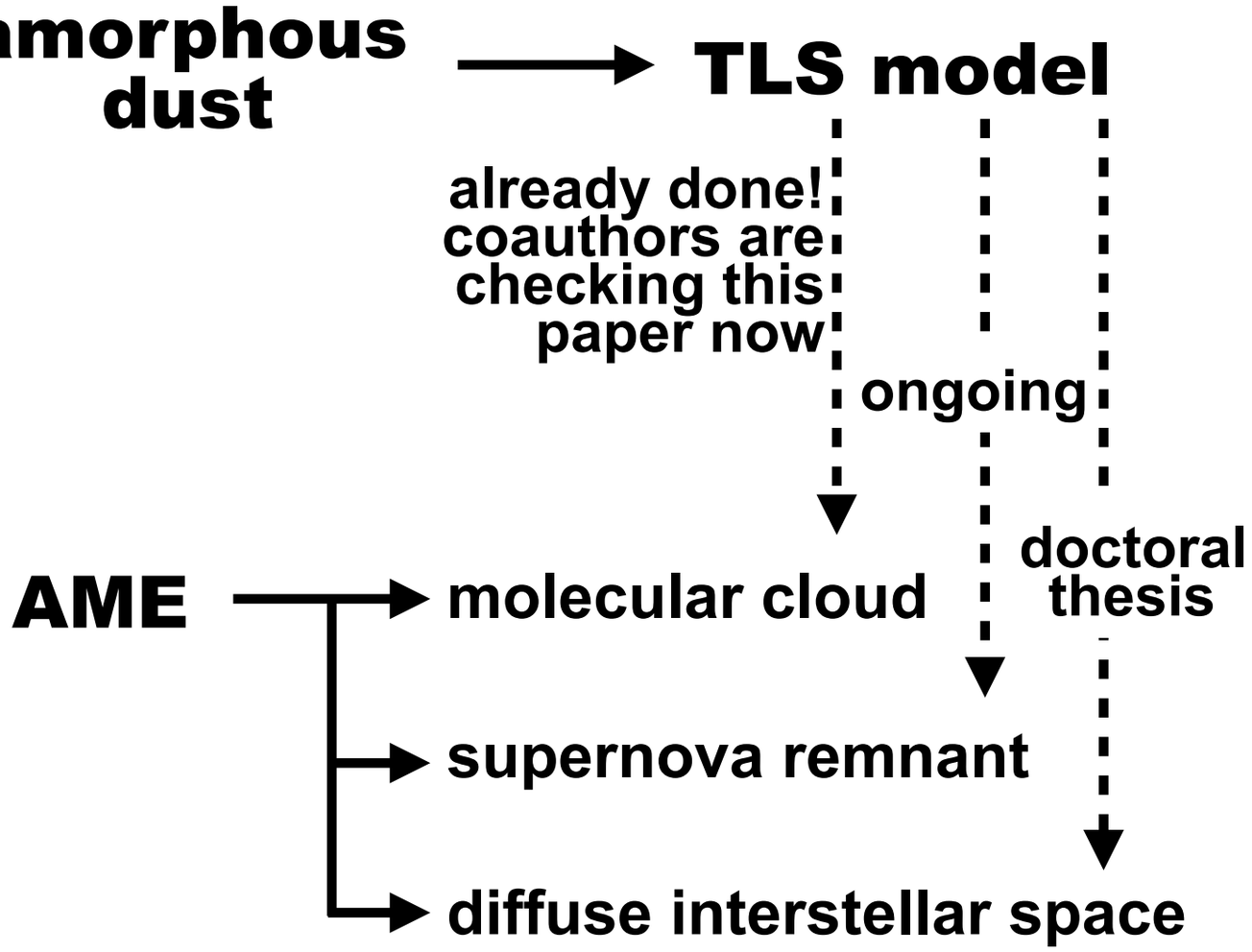

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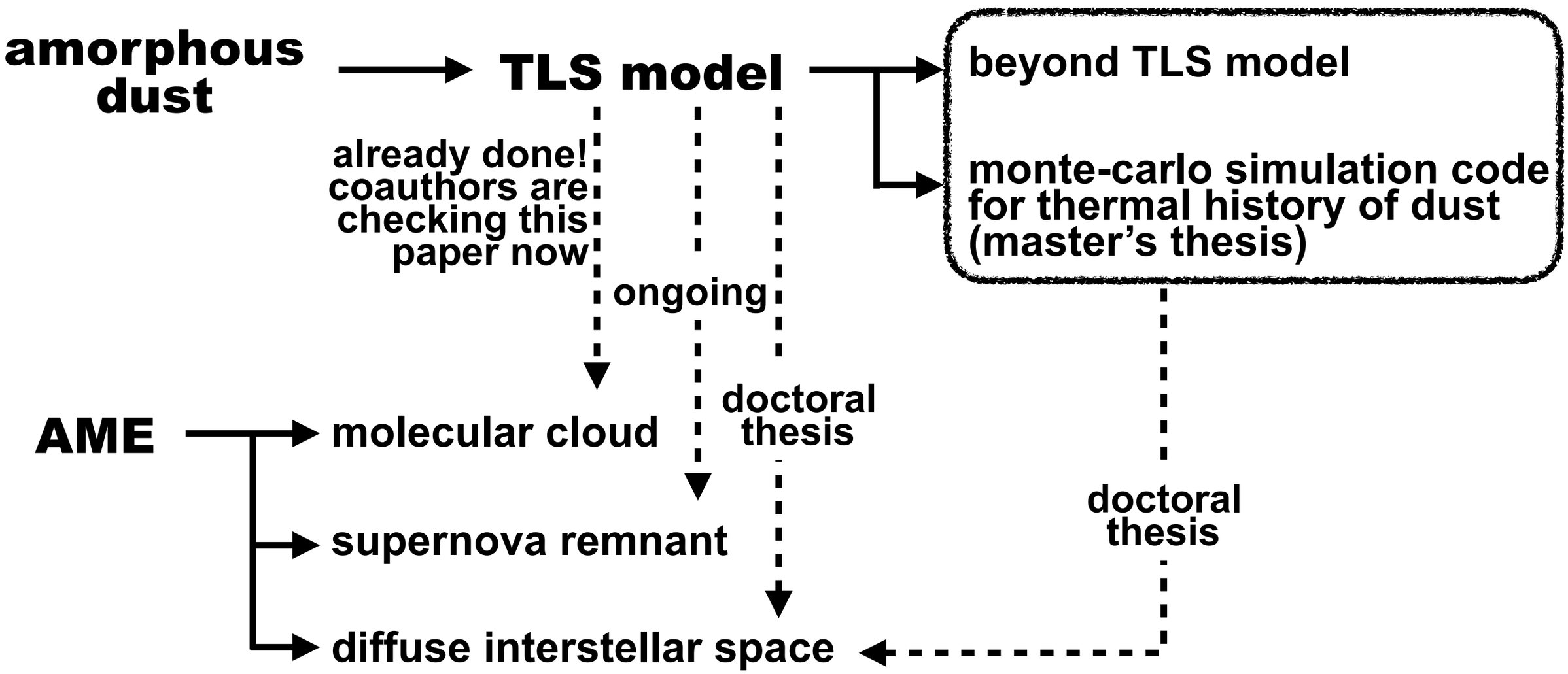

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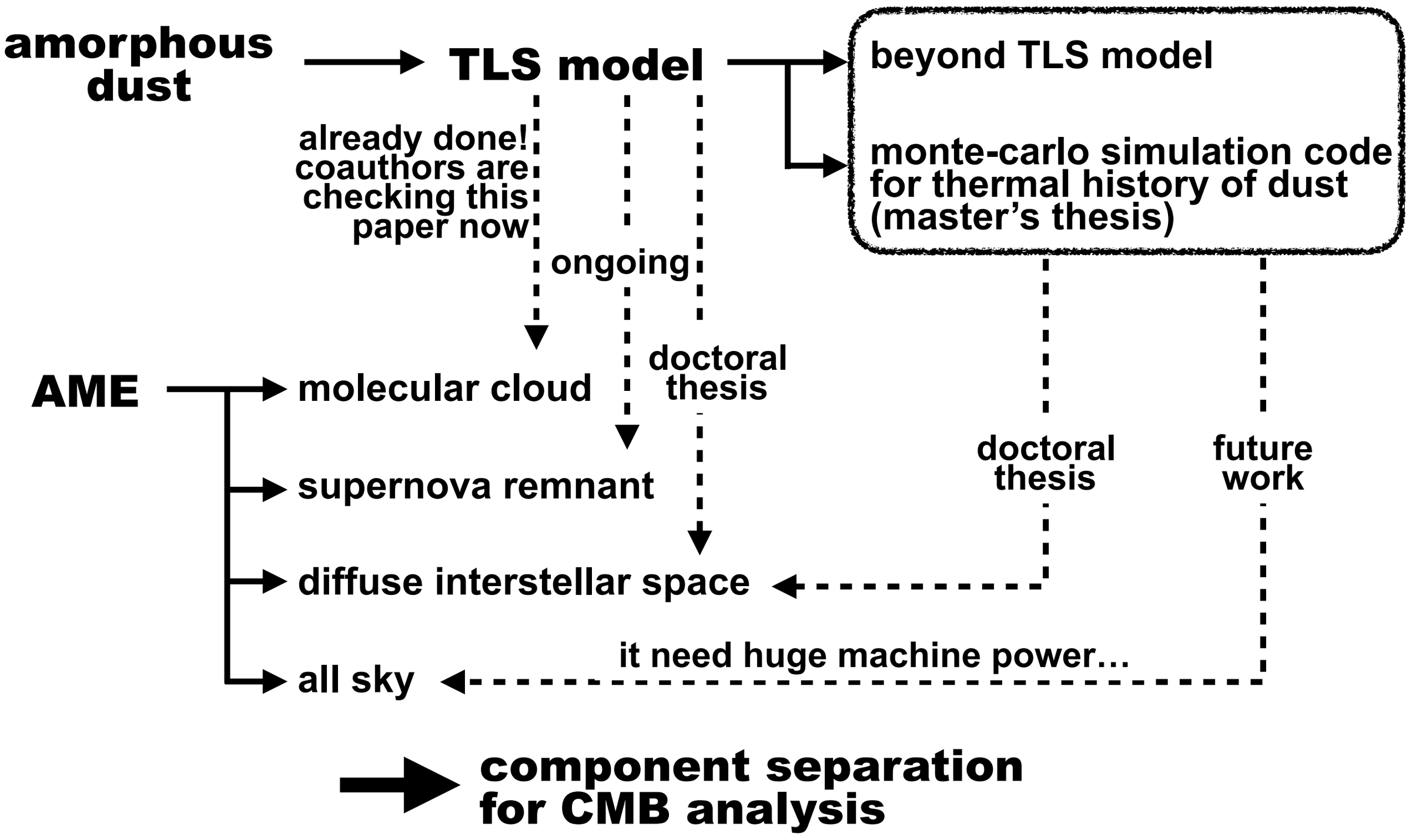

Summary

- I had been in Tenerife from September to December

- I studied amorphous dusts and AME with QUIJOTE members

- We showed the amorphous dust emission model can explain AME

- We will study toward CMB component separation using our amorphous dust model