Achieving High Angular Resolution in the Far-IR

The path to space-based interferometry

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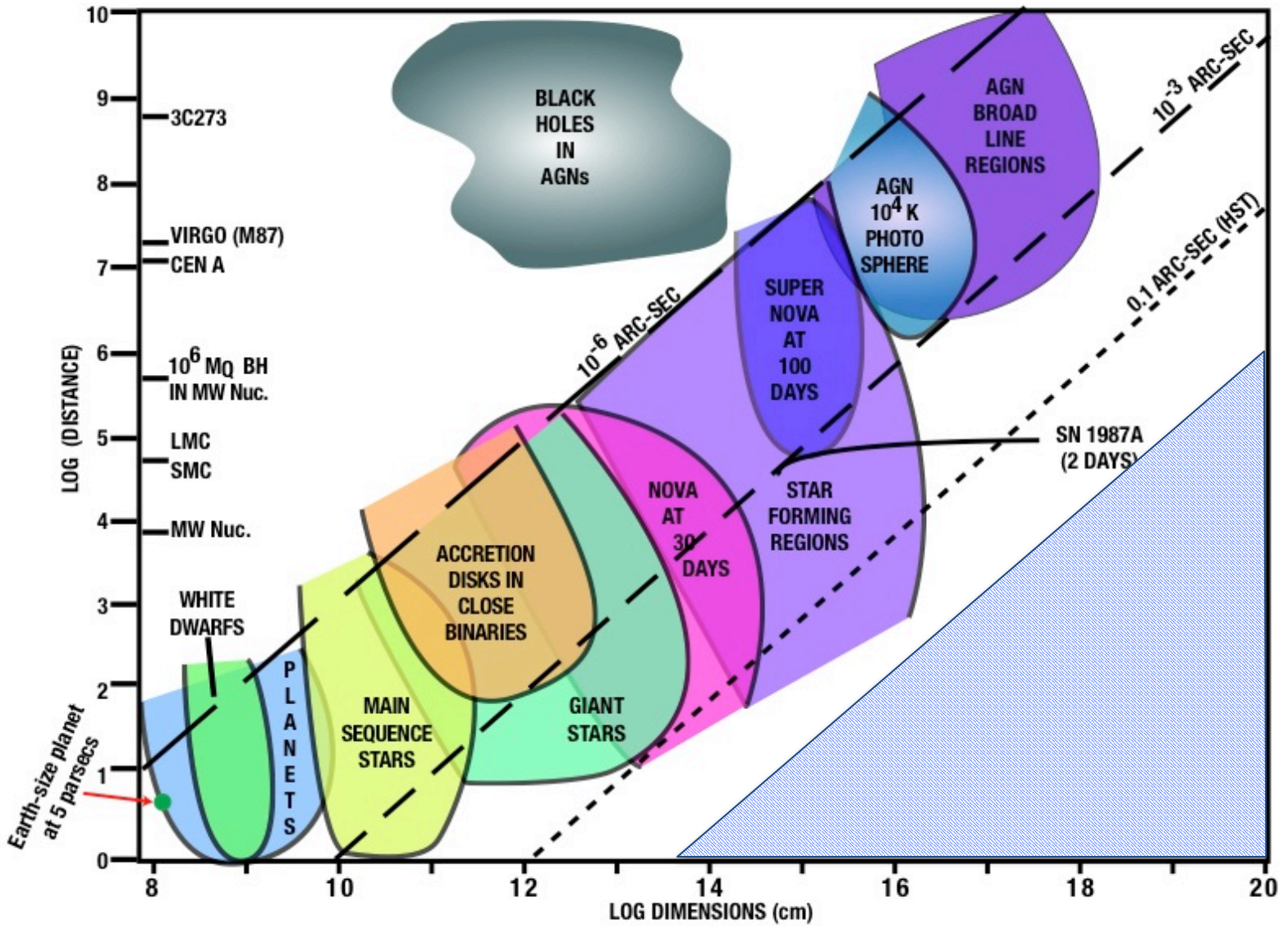
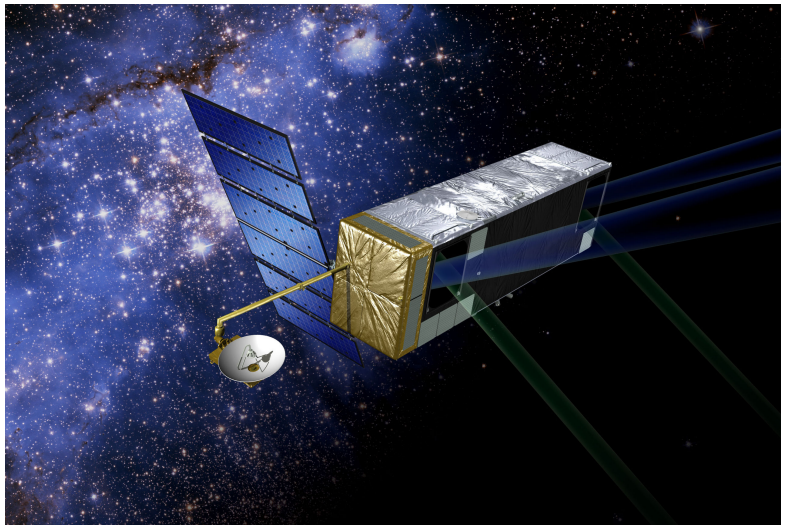
A Broad Science Argument

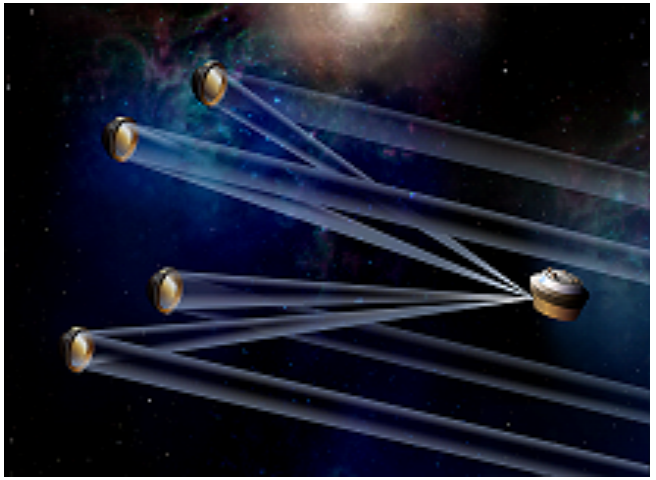


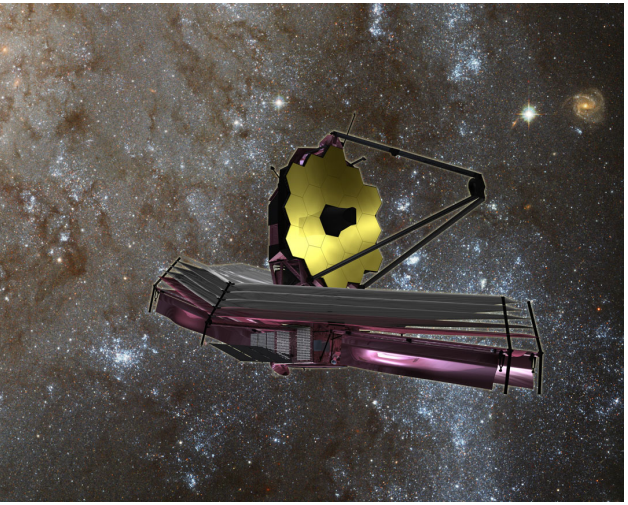
The 2000 Decadal

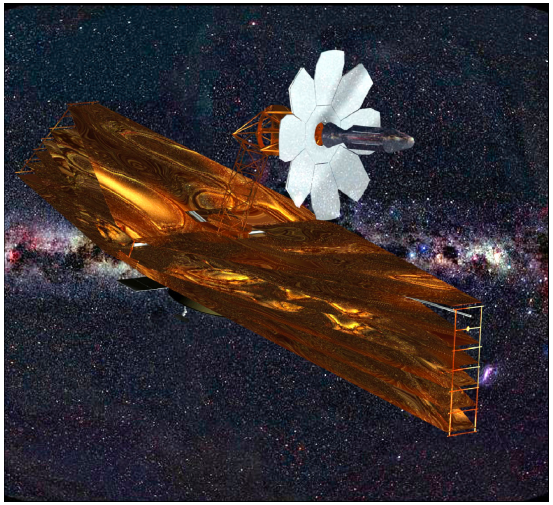
"A rational coordinated program for space optical and infrared astronomy would build on the experience gained with NGST to construct SAFIR, and then ultimately, in the decade 2010 to 2020, ***build on the SAFIR, TPF, and SIM experience to assemble a space-based, far-infrared interferometer****."*

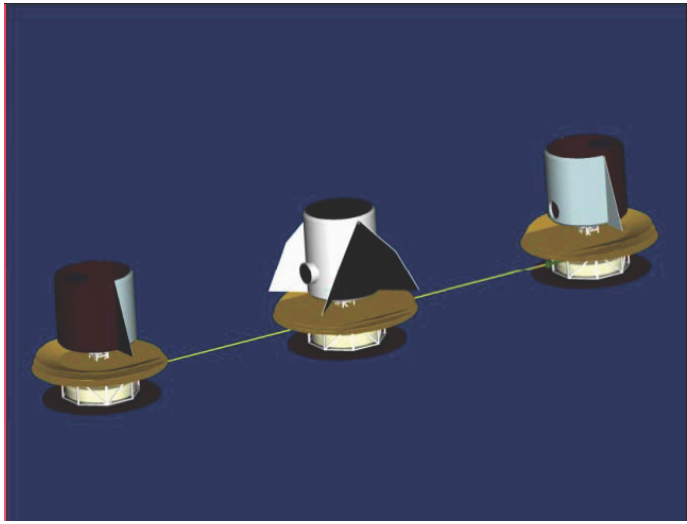
The Path in 2000







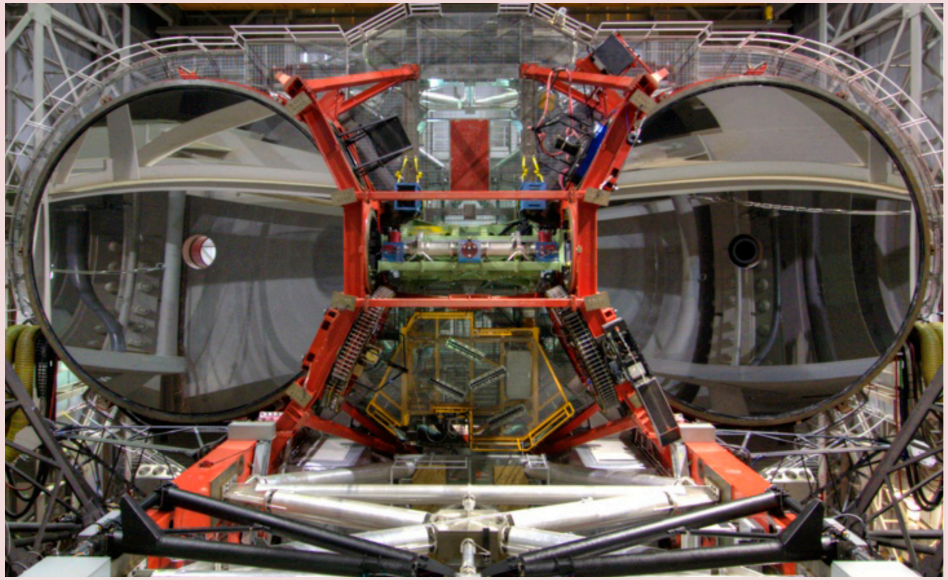


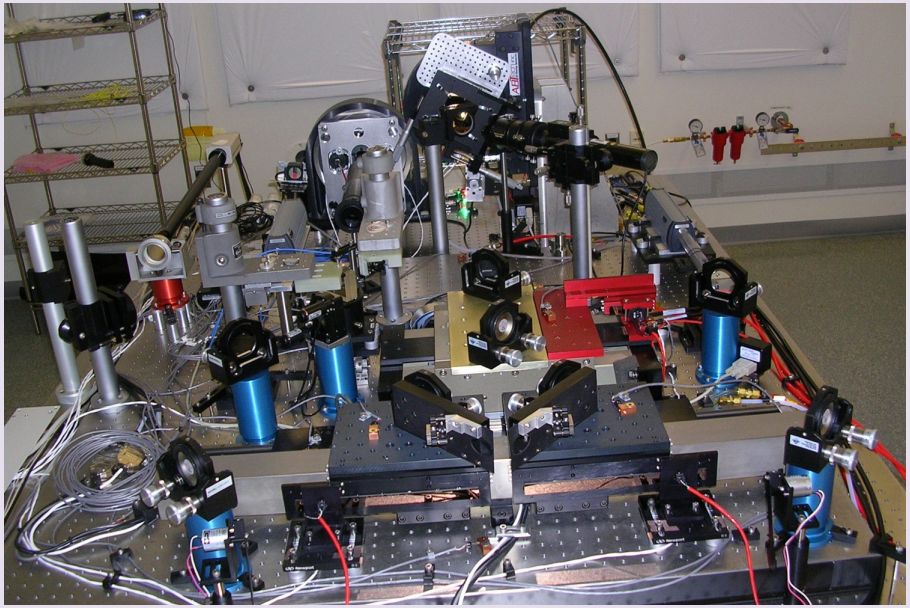


Past

Ground-based interferometers

- Keck-I
- LBT-I
- VLT-I
- CHARA
- NPOI

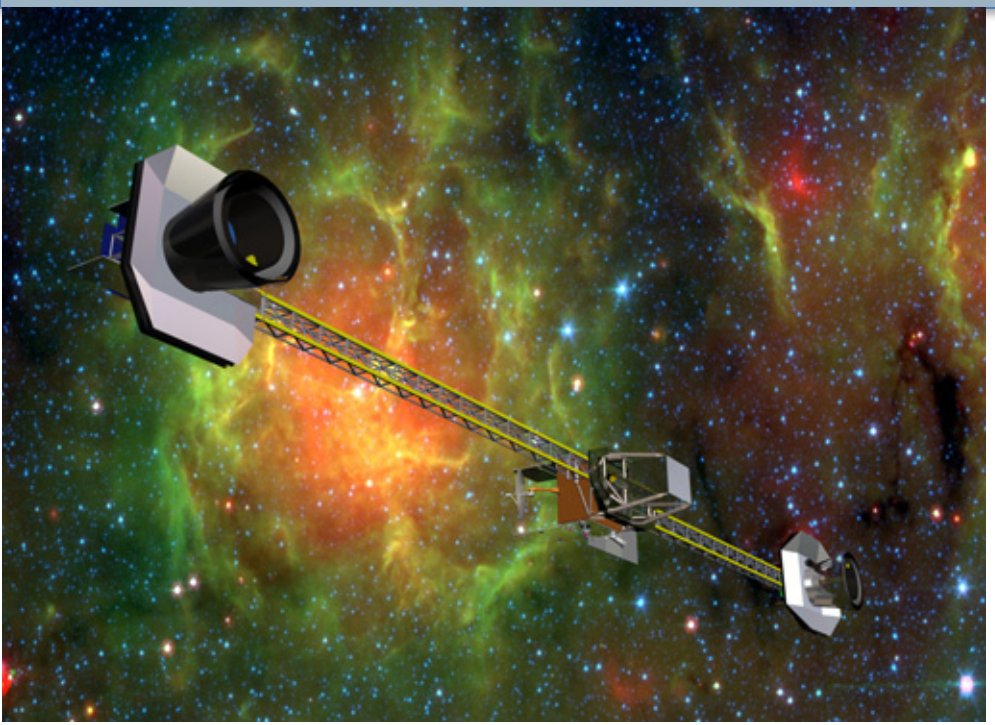




Testbeds:

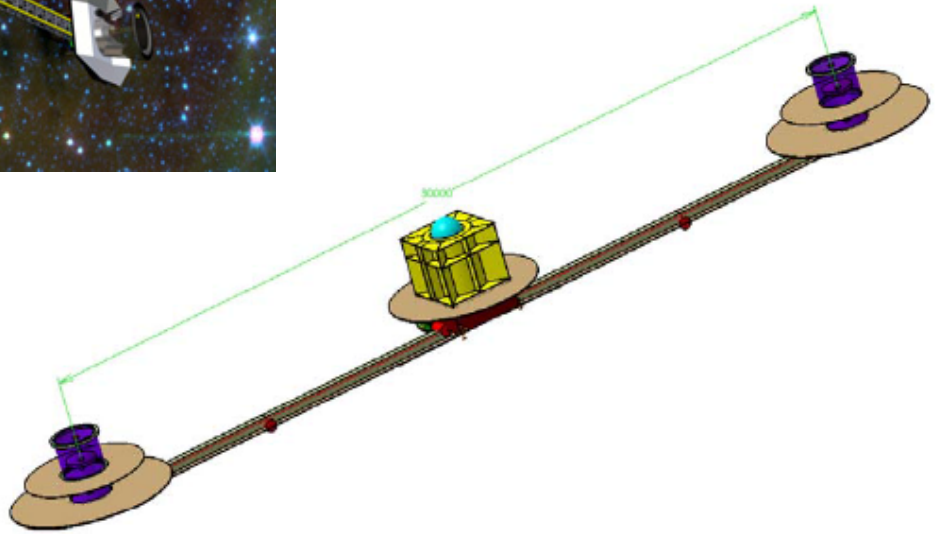
- WIIT (Wide-field)
- Cardiff (FIR)
- UCL (Thermal)
- Lethbridge (Phase cal.)

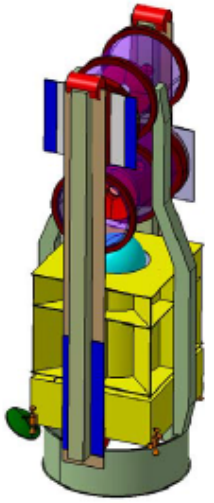
SPIRIT and FIRI



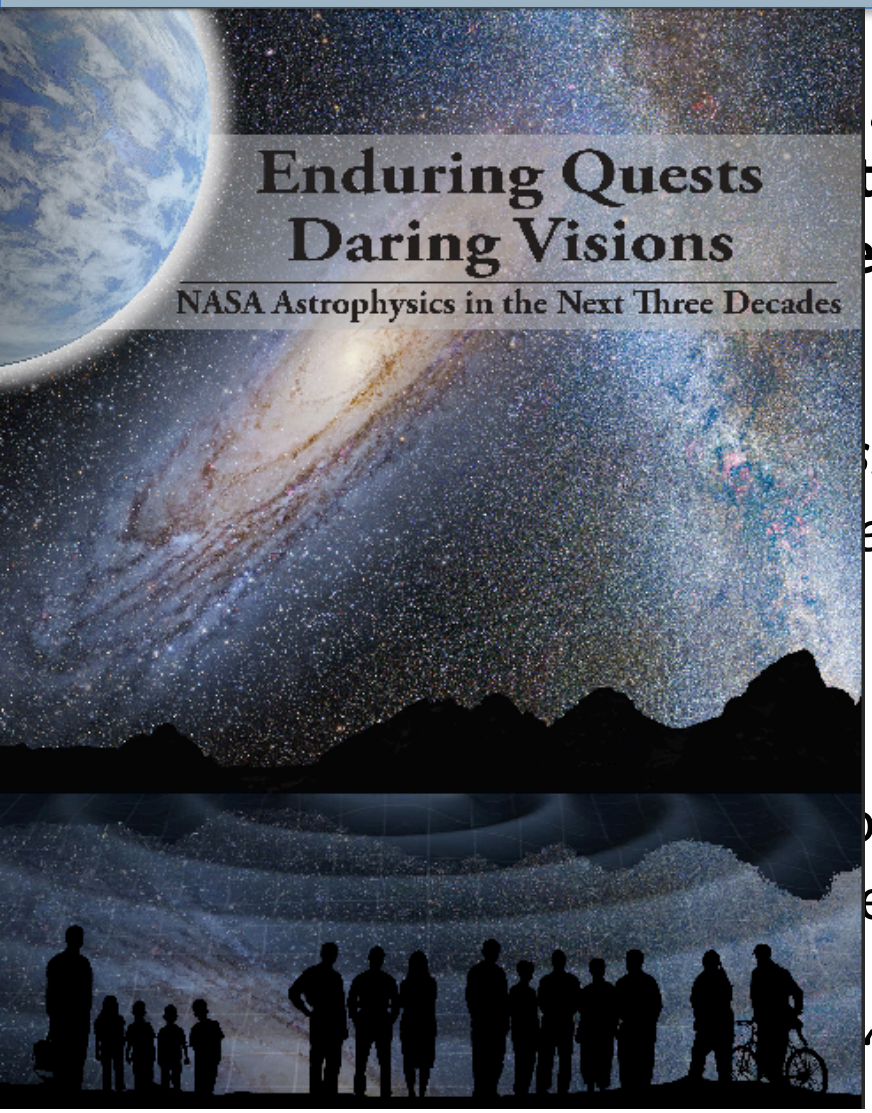
SPIRIT, circa 2009

FIRI, circa 2014





The Astrophysics Roadmap



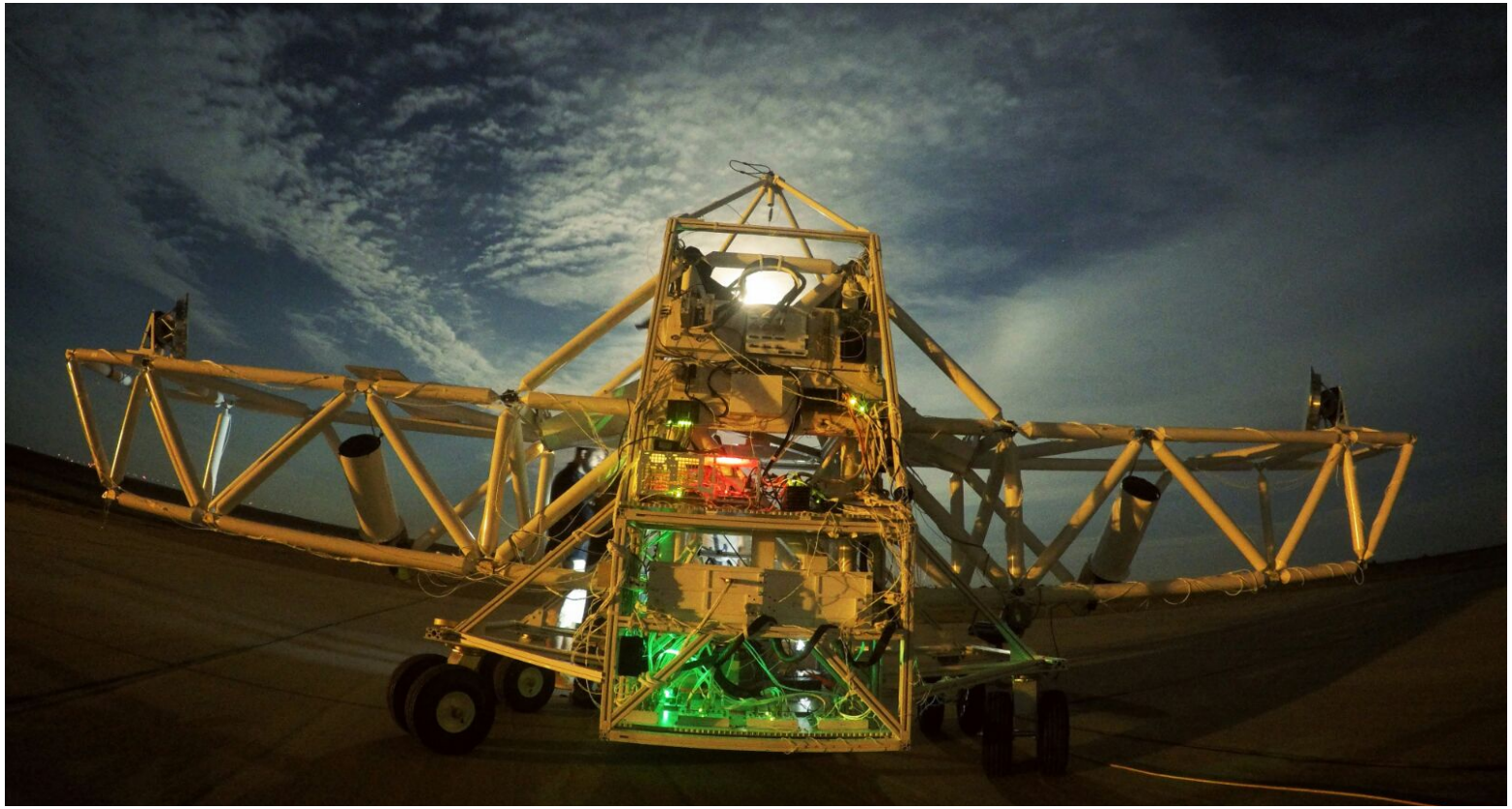
g regions on scales of a few thousand
tial-resolution observations from a
erometer".

sionary Era are interferometers, and
erometric techniques is thus highly
vision."

or interferometry in the FIR are not as
ength bands, so **FIR interferometry may**
that provides a useful training ground
"

Present

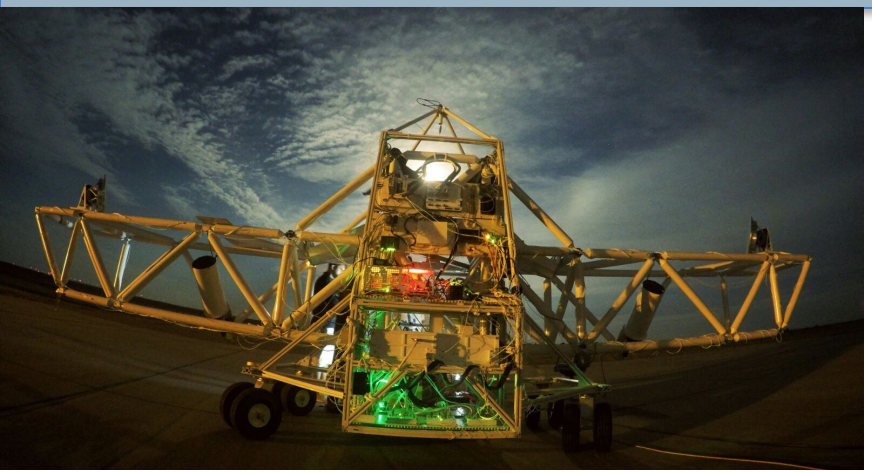
BETTII (Balloon Experimental Twin Telescope for Infrared Interferometry)

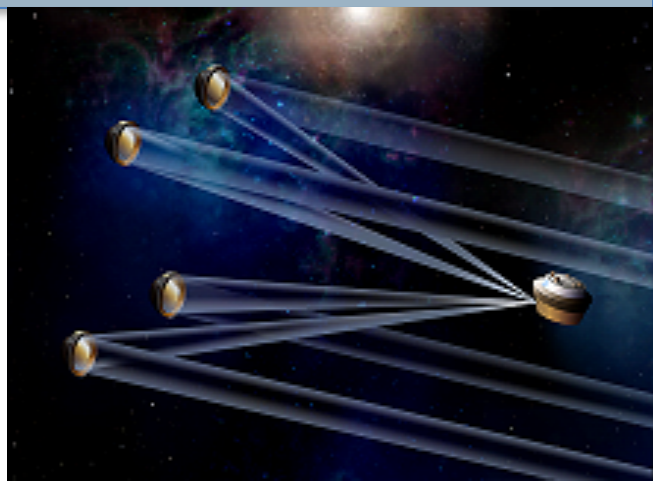


BETTII

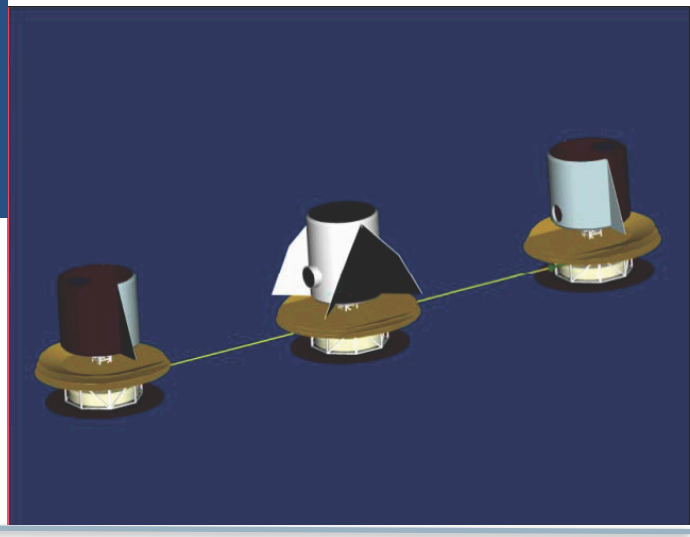
BETTII: A bad landing

The Path (?)

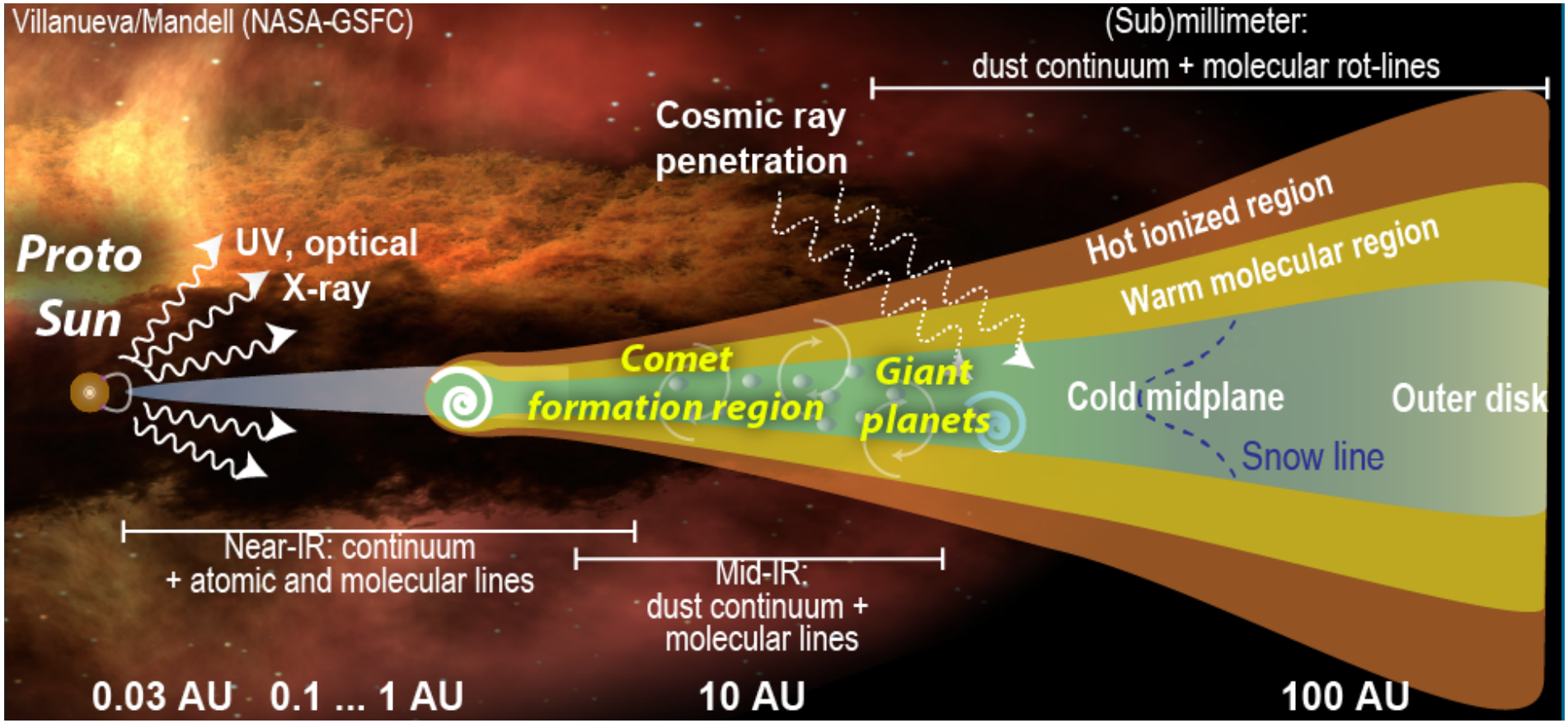




?



Scientific Motivation (FIR)



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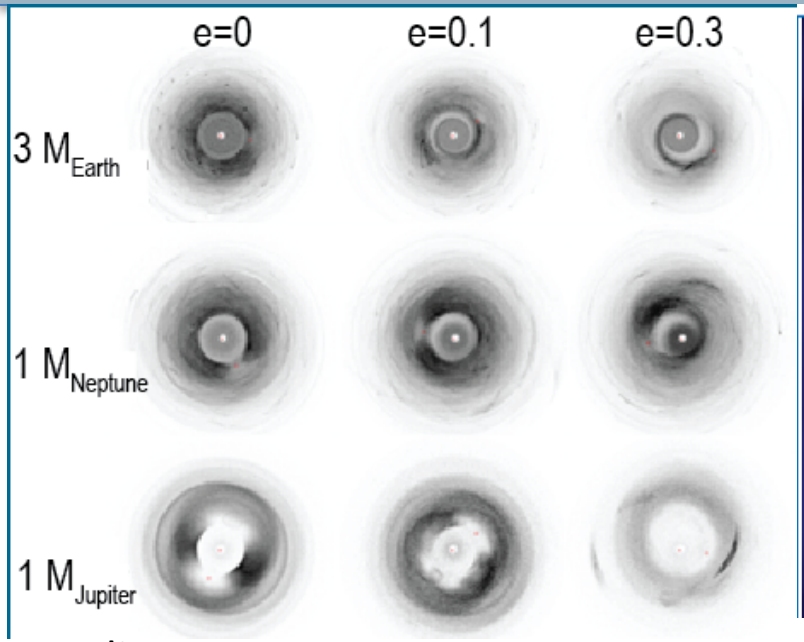
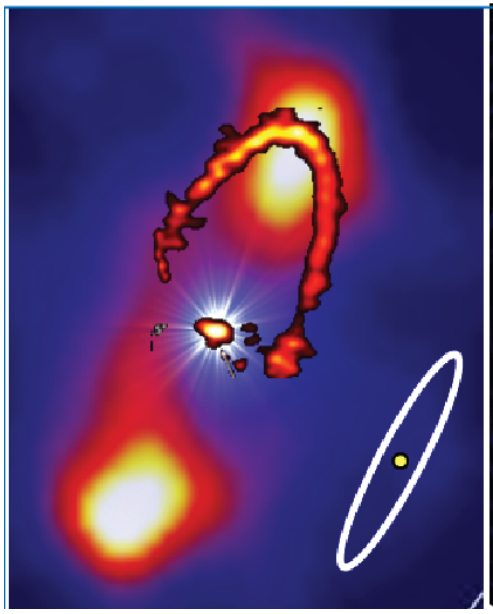
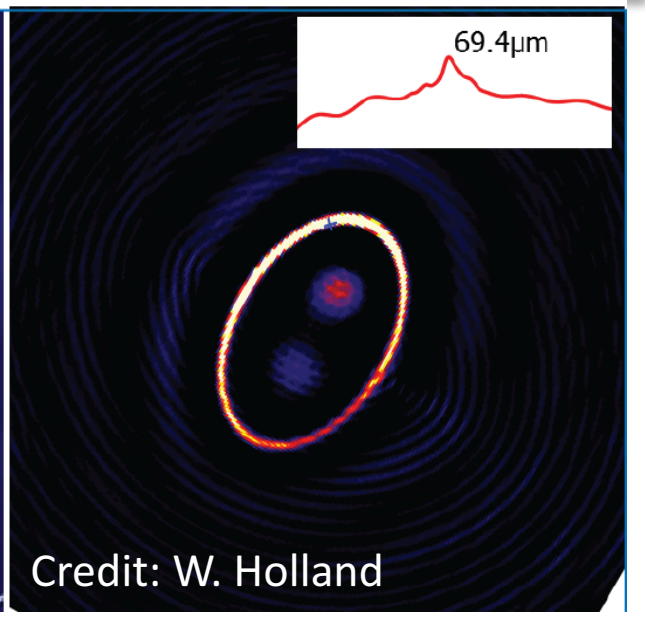
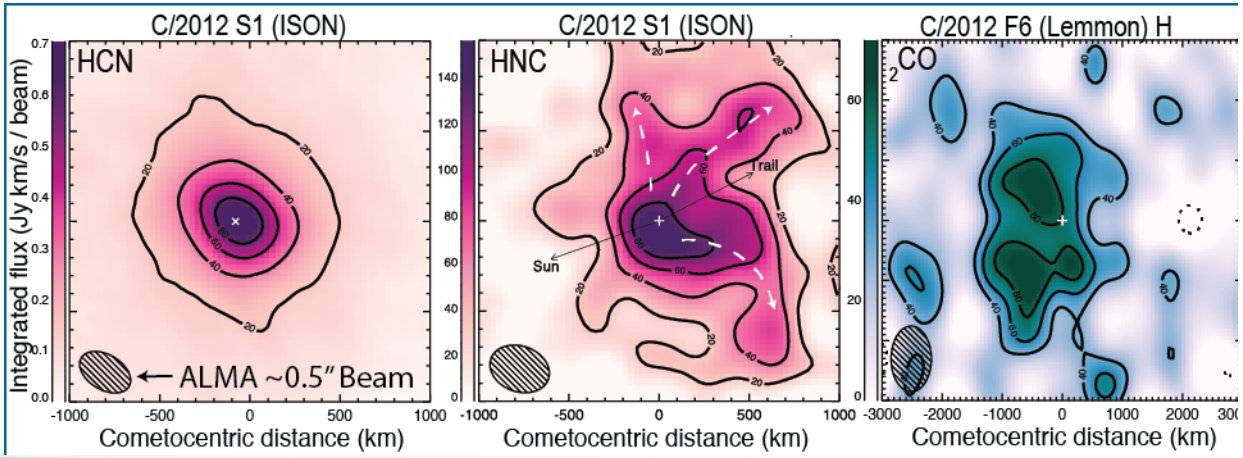


Credit: K. Su



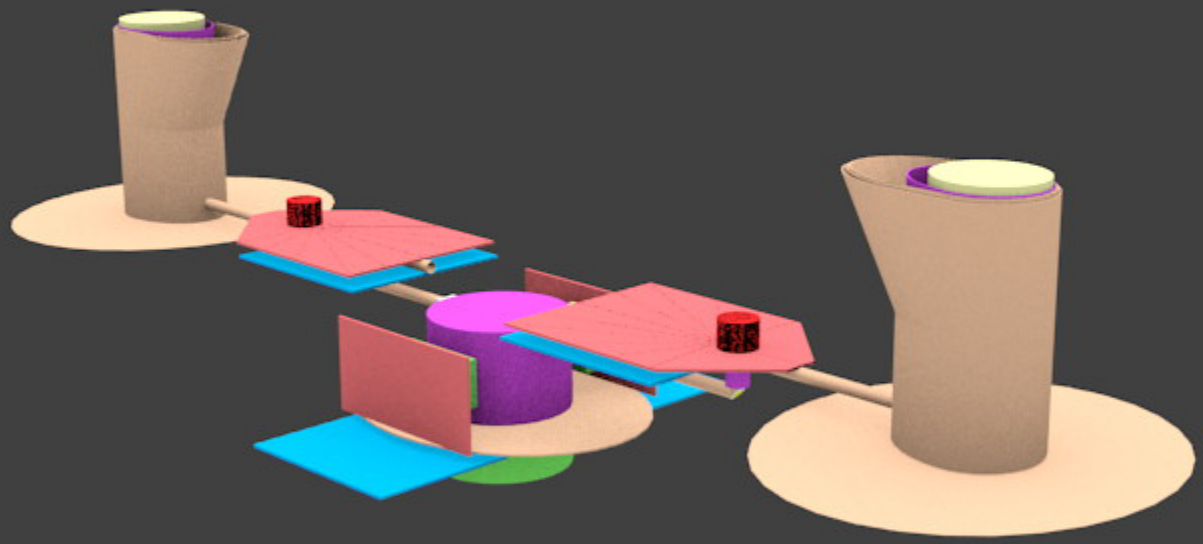


Credit: M. Cordiner



The Future

Space High Angular Resolution Probe for the Infrared (SHARPIR)



Conclusions

- High angular resolution will open new scientific doors
  - Only achievable with interferometry
- Interferometry faces serious challenges
  - Perception problems!
  - Conflicting desires – bigger, or smaller?

- Next steps
  - Plan (hope) to rebuild BETTII (BETTII2)
  - Study the SHARPIR concept
  - Simulations of interferometric capabilities
  - Continued work with testbeds