Faint Science Array Concepts

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- Array Concepts
- Science
- Preparatory Work
- Recommendations

Array Concepts to Study

(Basically Fizeau imagers)

Linear Fizeau Array - 100-300 m

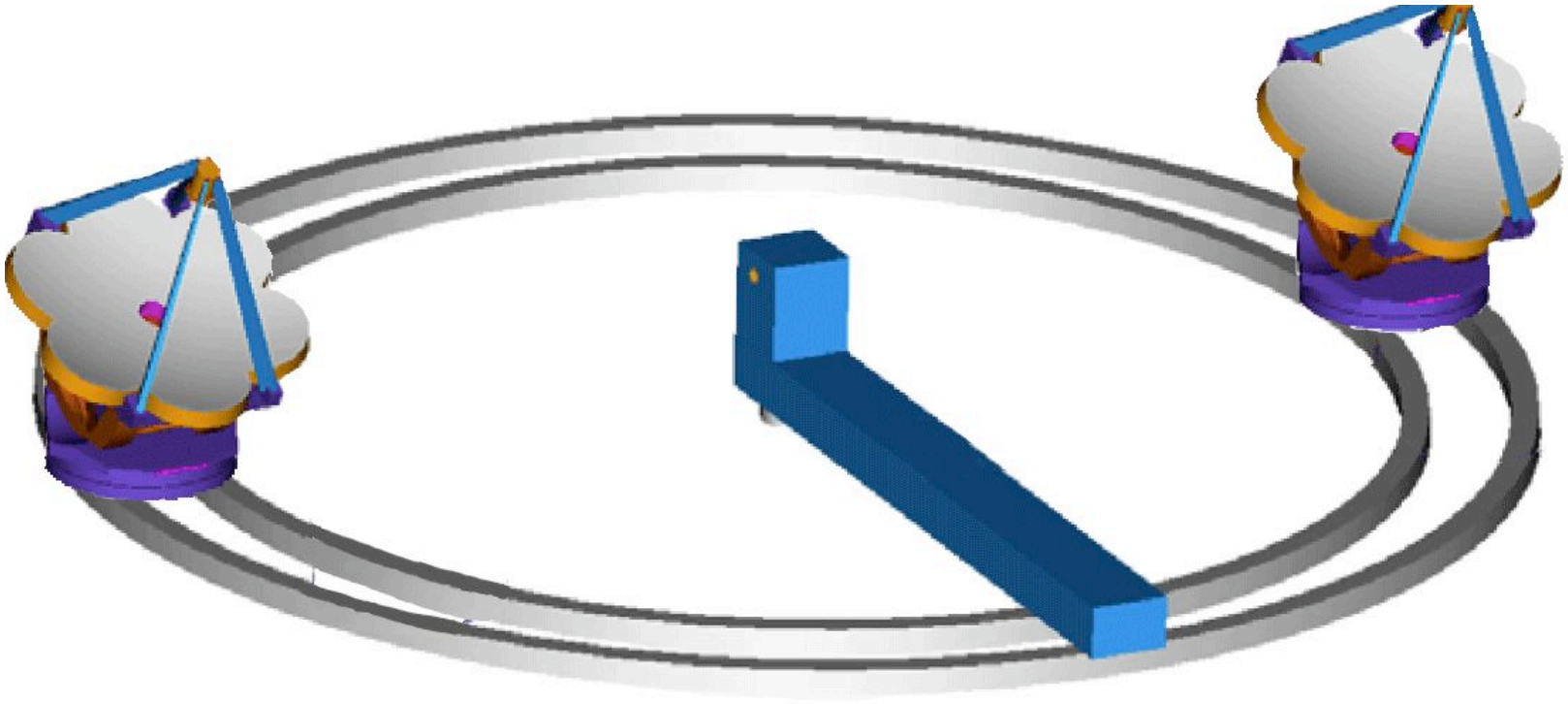
Pros: rapid filling of (u,v) plane
existing technology
Cons: boom flexure, etc.

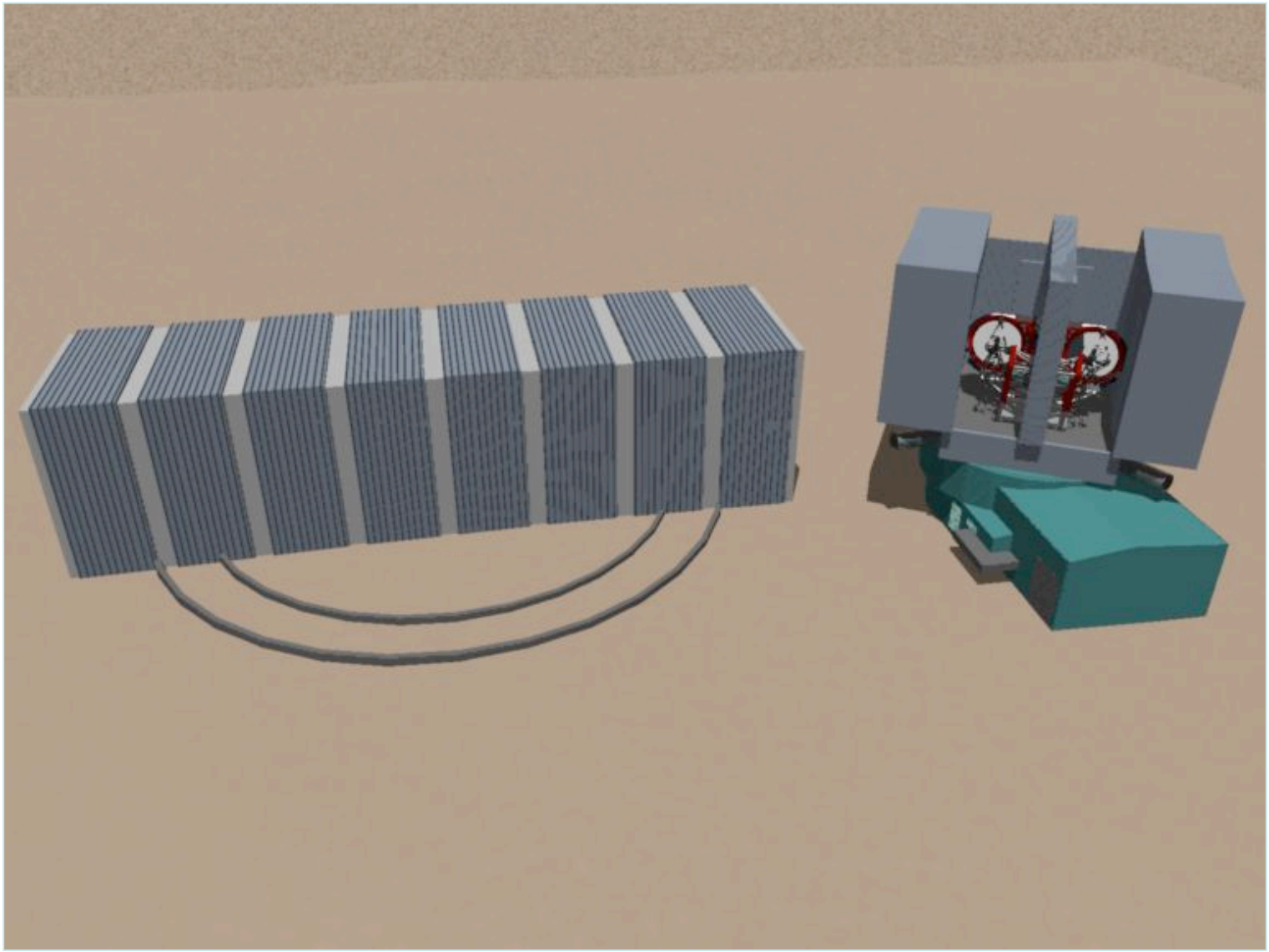
20/20 Style

Pros: greater sensitivity (larger antennas)
Cons: longer to fill (u,v)
(changing baseline vs Earth-rotation synthesis)

Changing the Baseline…

ca. 100 m



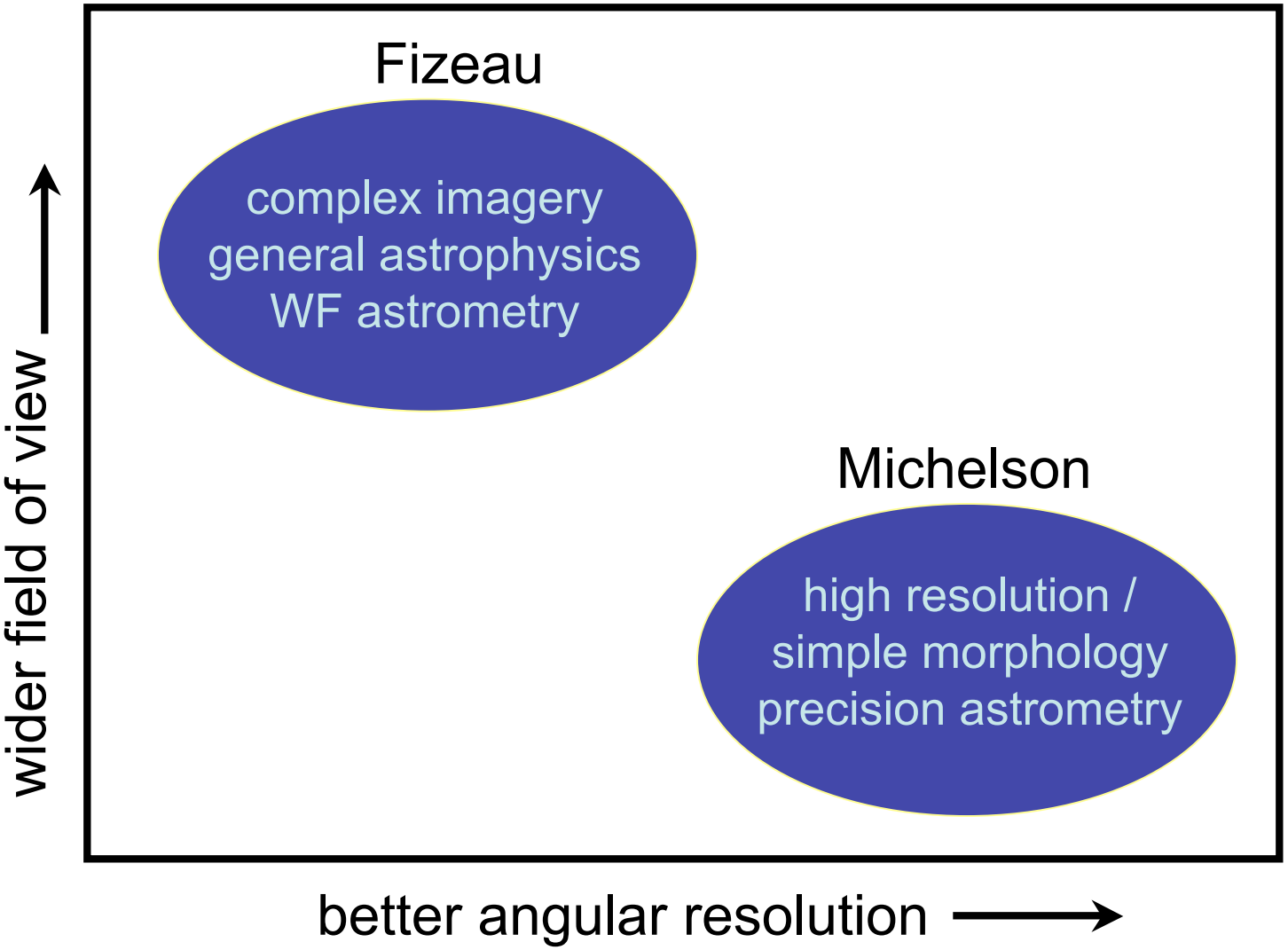


Science

- faint compact sources (SNe, GRB, AGN cosmology)
- faint extended sources (AGN environments, high-z galaxies)
- crowded fields (stellar pops in Virgo, stellar dynamics near BH)

NOTE: Fizeau imagers are general astrophysics tools
- true panoramic imagery (limited by AO)
- complex sources (phase for free)
- lots of bright(er) science

Interferometry Science Phase Space



Preparatory Work

- FRINGE TRACKING !
  - high performance fringe trackers
  - zero noise detectors (NIR)
  - novel approaches (i.e. signal co-addition, lasers)

- AO strategies to increase iso-patches + access shorter lambda
  - increase sky coverage for FT stars
  - i.e. MCAO (+on-axis beacon?)

- Gigapixel science arrays
  - ref: Hawaii2 = 2.5 arcsec field for 100 meters

- Transfer optics
  - large field ==> large angles ==> large optics

- Large structures, stability, active control
  - Mechanical Fizeau condition ~10 microns

Recommendations

- study / trade off Linear Fizeau Array versus 20/20 Type
- do preparatory work
- trade off linear array size, Ntel, spacing, non-redundant
  - outriggers? core of Bright Array? (like ACA)
- study smart focal planes (deployable cameras / IFUs)
- image reconstruction techniques