Diameters in the Beta Pic Moving Group Measured with CHARA/CLASSIC

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Observed in 2010 and 2011 in observing time assigned through the NOAO

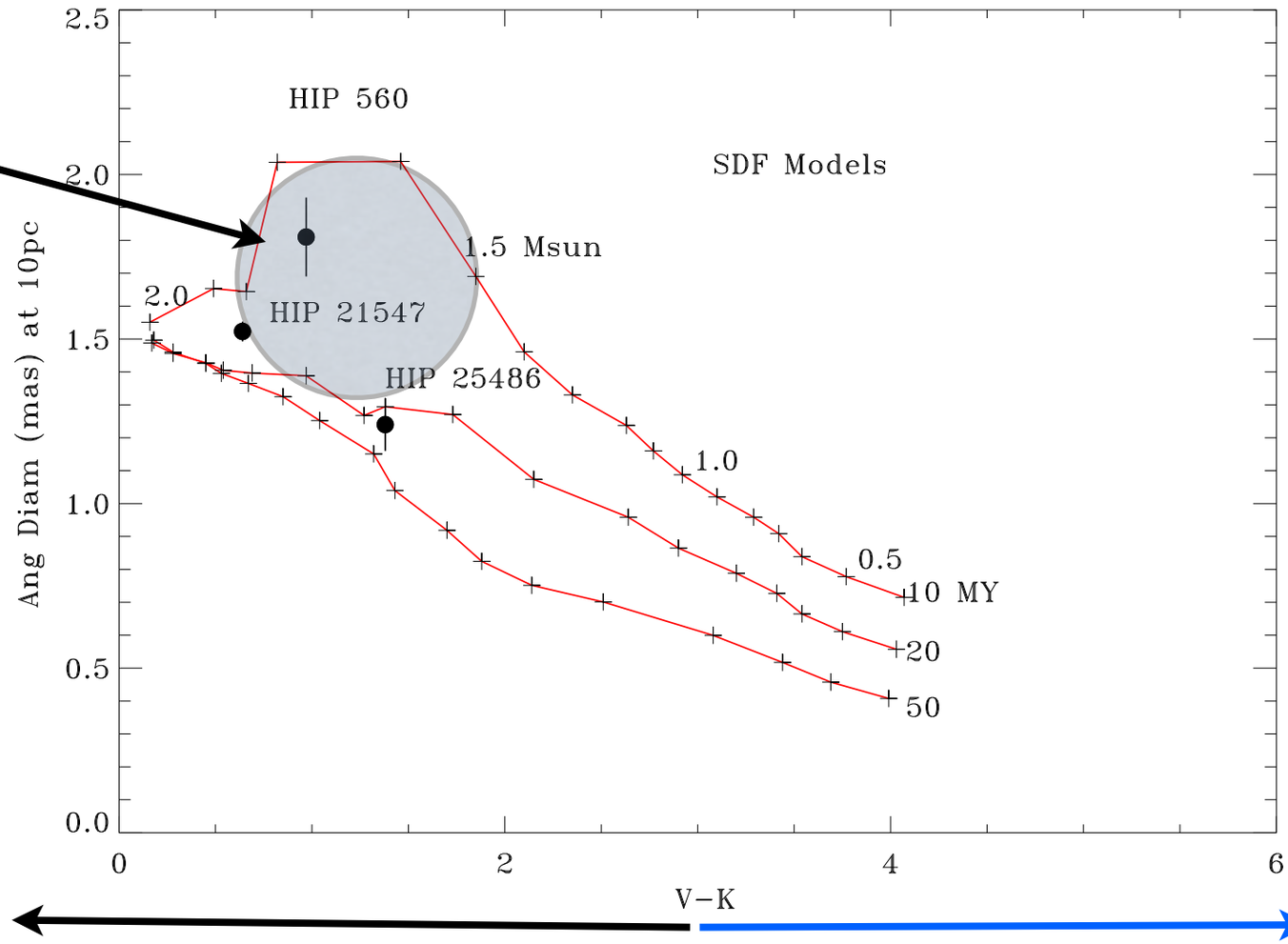
2010 results published in ApJ 743, 158 (2011)

Goal: To determine the ages of young stars by measuring their diameters as they contract to the main sequence.

"Sweet Spot" for observations, F and G spectral type stars

CAUTION:

Young A, F stars rotate fast!

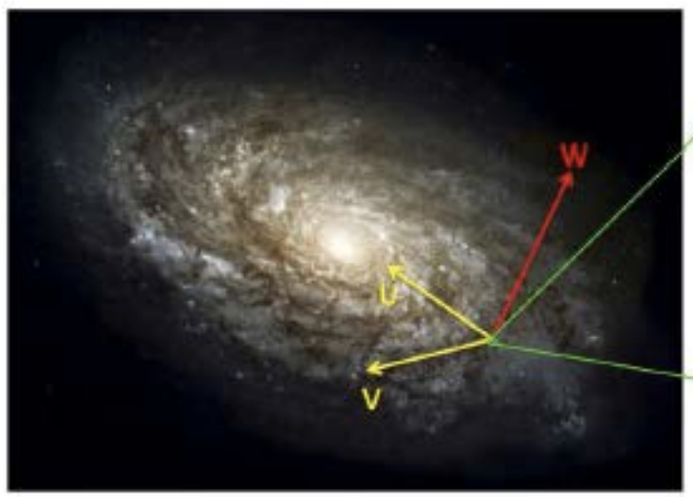


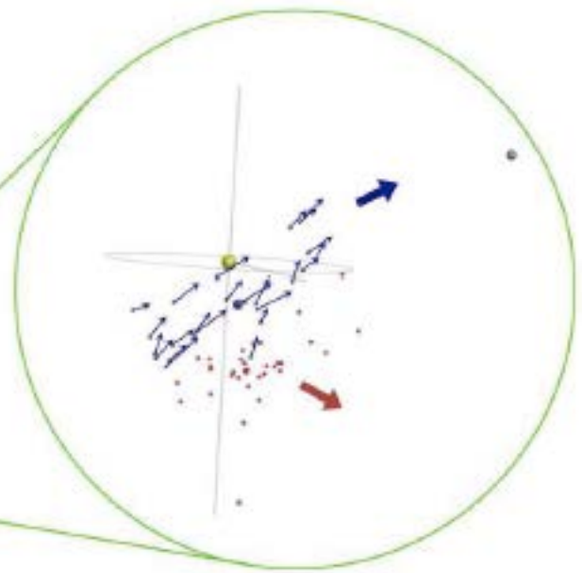
Models calculated by different groups agree well

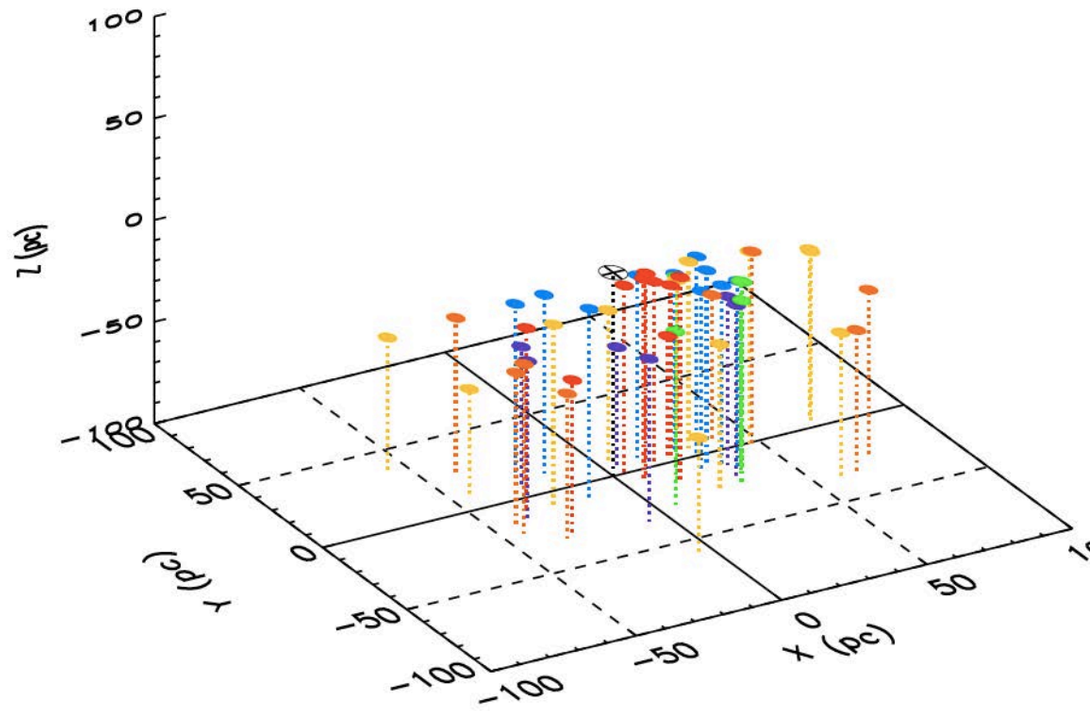
Models differ at M < ~1 Msun

Why the Beta Pic Moving Group?

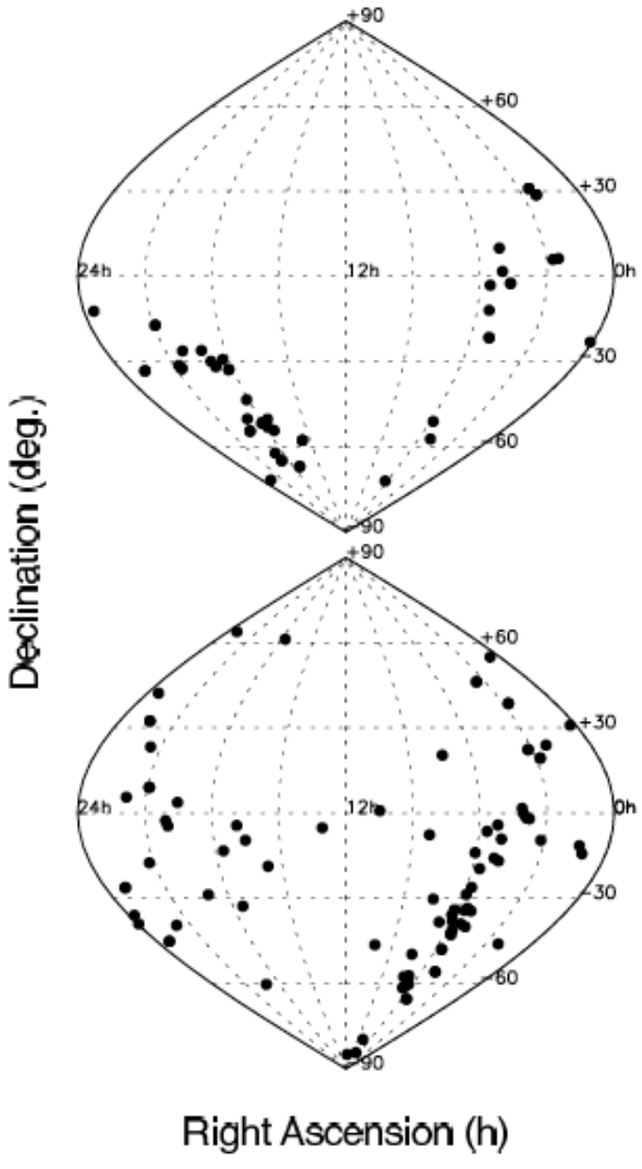
1) Its stars are young (10-20 My) and nearby (median d=35 pc)







2) Some of its stars are observable in the north



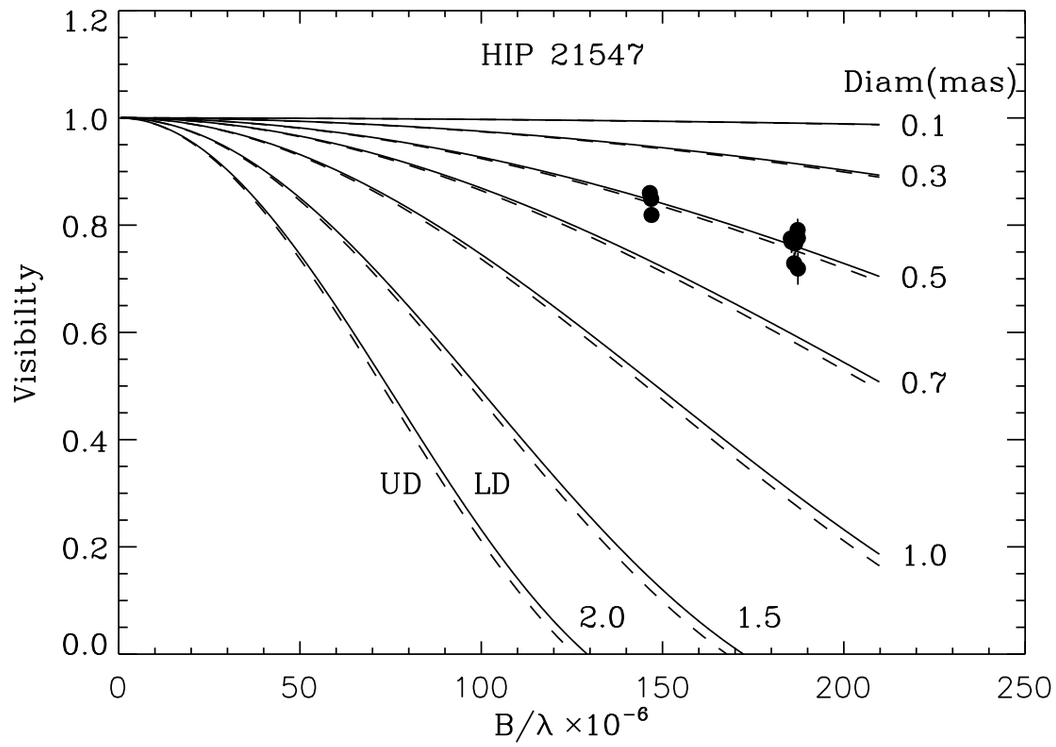
Beta Pic Moving Group

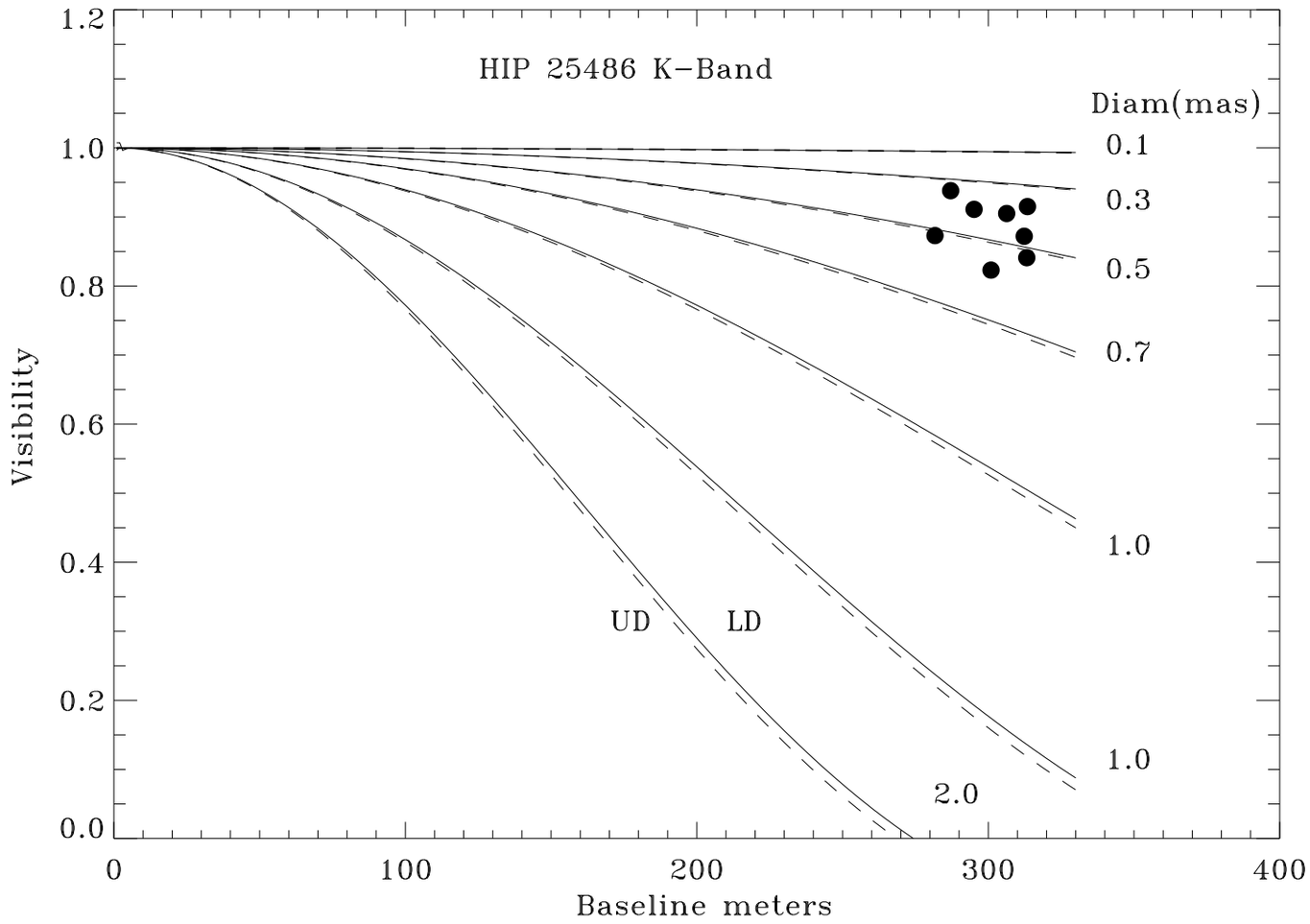
AB Dor Moving Group

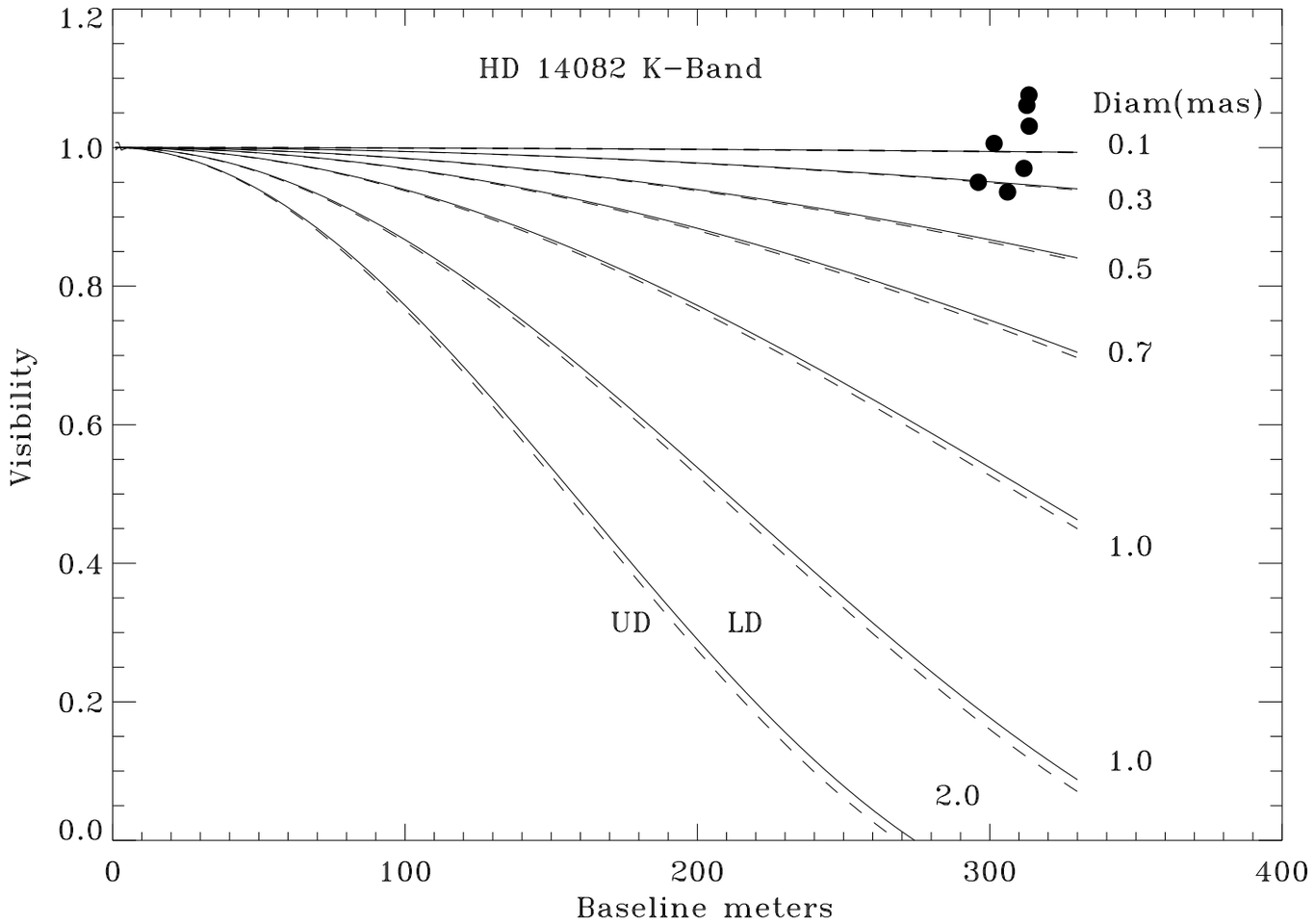
Stars Observed:

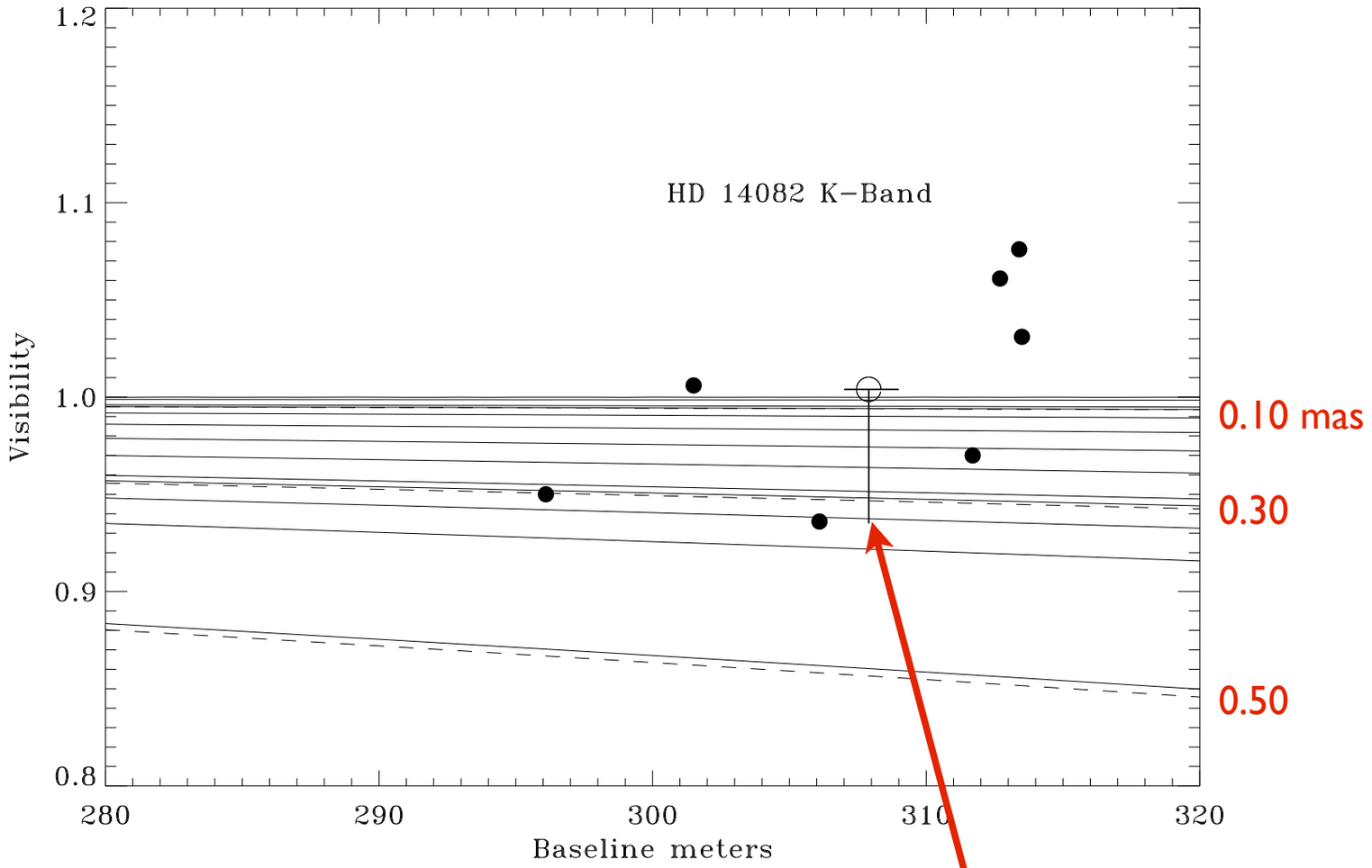
Star	SpTy	K	Dist pc	Diam Msrd mas	Predicted^* McCarthy/White
HIP 560	F3V	5.2	39.4+-0.4	0.46+-0.03	0.37
HIP 21547	F0V	4.5	29.4+-0.3	0.52+-0.01	0.52
HIP 25486	F8V	4.9	27.0+-0.4	0.46+-0.03	[0.40]
HIP 10680 (HD 14082A)	F5V	5.8	34.5+-3.5	<0.36 3-sigma	0.30

From empirical L, Teff => Rstar + Hipparcos parallax, AJ, in press

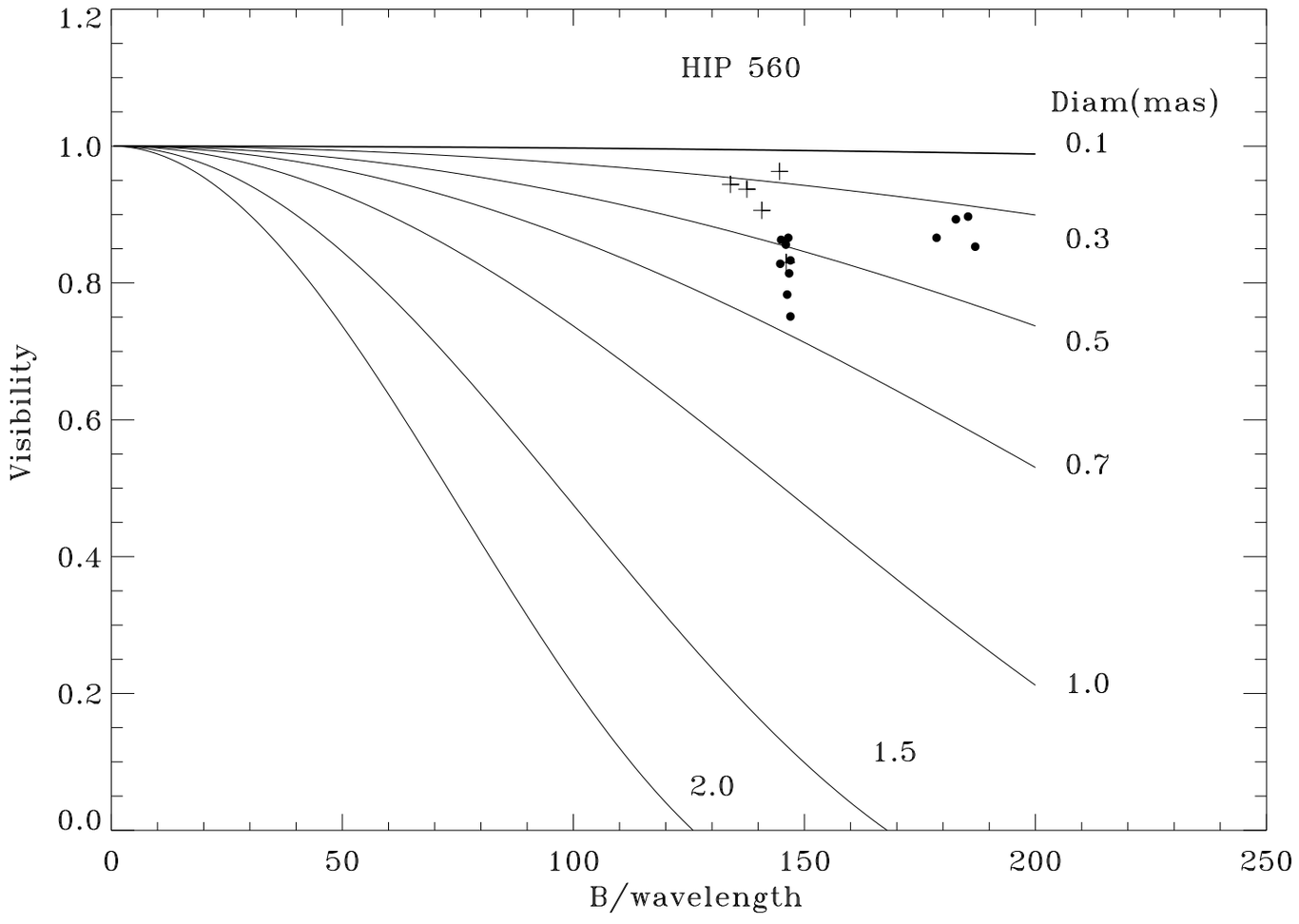

HIP 21547
Diam(mas)
0.1
0.3
0.5
0.7
1.0
1.5
2.0
UD
LD
Visibility
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
250
B/λ ×10⁻⁶


HIP 25486 K-Band
Diam(mas)
0.1
0.3
0.5
0.7
1.0
1.0
2.0
UD
LD
Visibility
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
Baseline meters

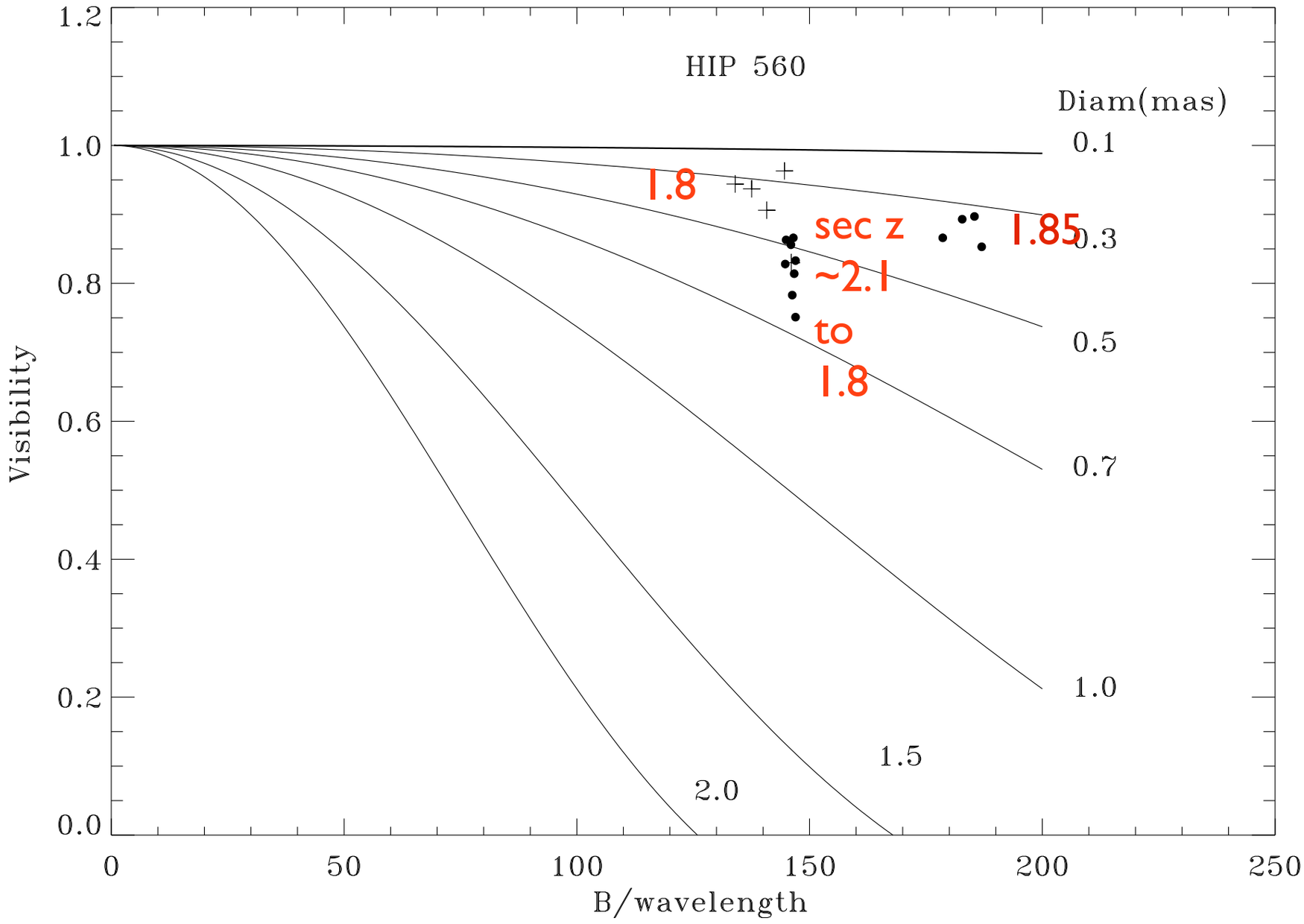

HD 14082 K-Band
Diam(mas)
0.1
0.3
0.5
0.7
1.0
1.0
2.0
UD
LD
Visibility
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
Baseline meters



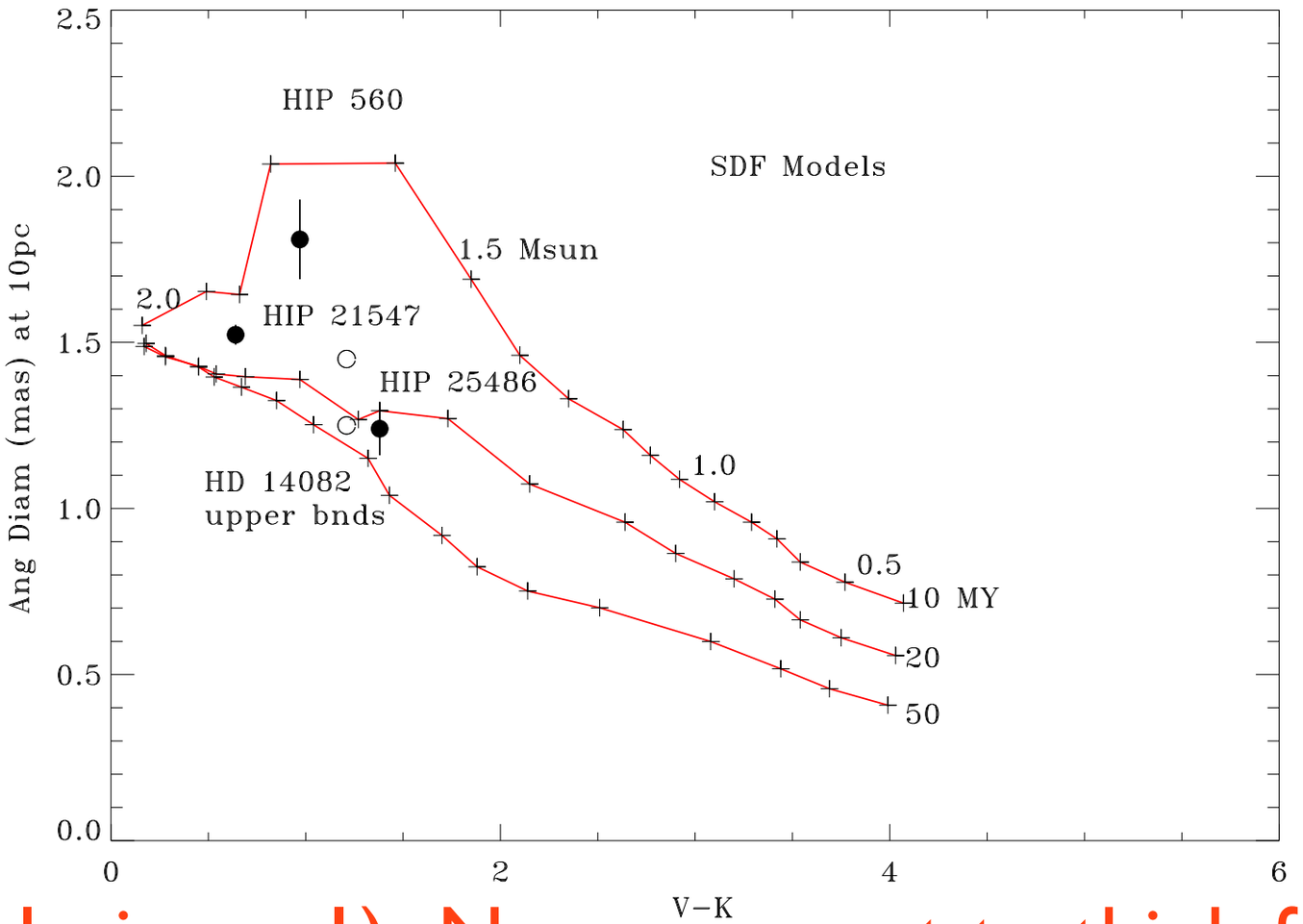
0.36 mas, 3-sigma upper bound


HIP 560
Diam(mas)
0.1
0.3
0.5
0.7
1.0
1.5
2.0
Visibility
B/wavelength
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
250

- K and H, 9/2010 + K, 11/2011



Results:



Star	Age My
HIP 560	13+-2
HIP 21547	15+-2
HIP 25486	25+10-6
HD 14082	>16

Conclusions: 1) No reason yet to think formation not isochronous
2) BPMG Age probably 15-20 My
3) Need to find K, M stars at D < 10 pc in the north

Lessons: 1) Beware large airmass