# Results From the BANYAN All-Sky Survey (BASS)

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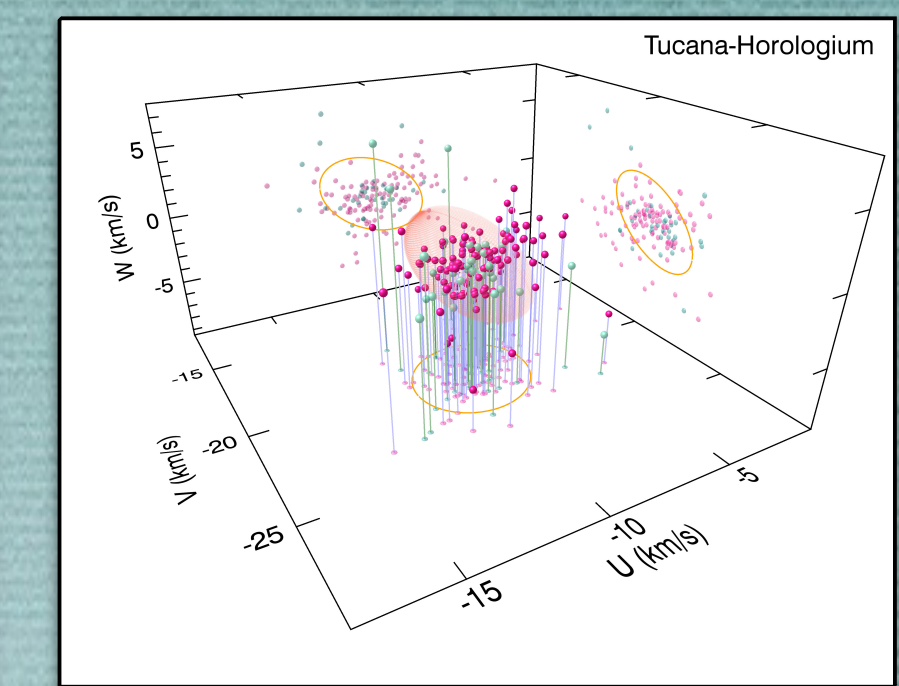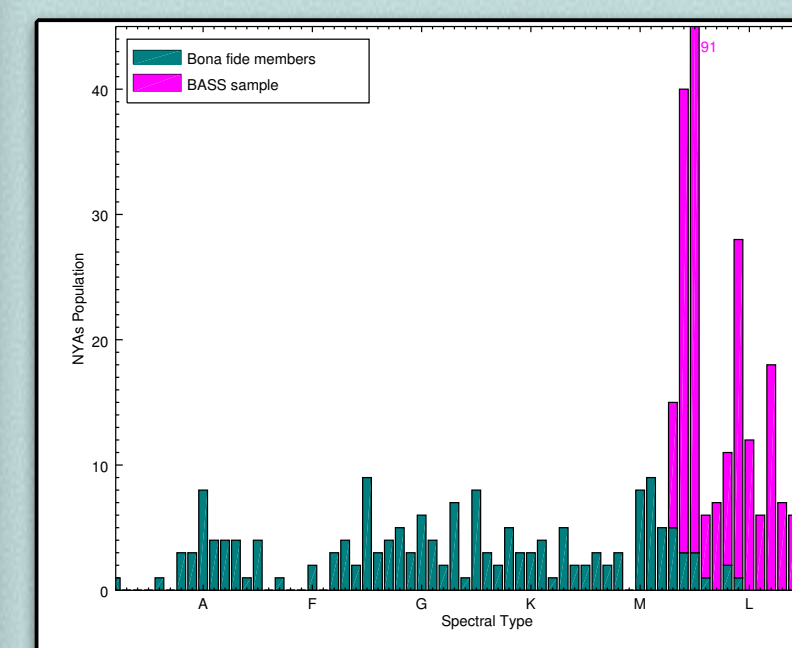*Cool Stars 18*

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I : The BASS catalog

- Cross-match of the whole 2MASS and ALLWISE
- 100,000 Potential > M5 stars
- Bayesian Analysis (BANYAN II) cuts down to ~ 200 M4 – L6 young moving group (YMG) candidates
- The most up-to-date fraction of old objects in this high-priority sample is ~10 %
- ~ 300 additional low-priority candidates with a false-positive rate of ~50 %

β Pictoris

Bona Fide Members
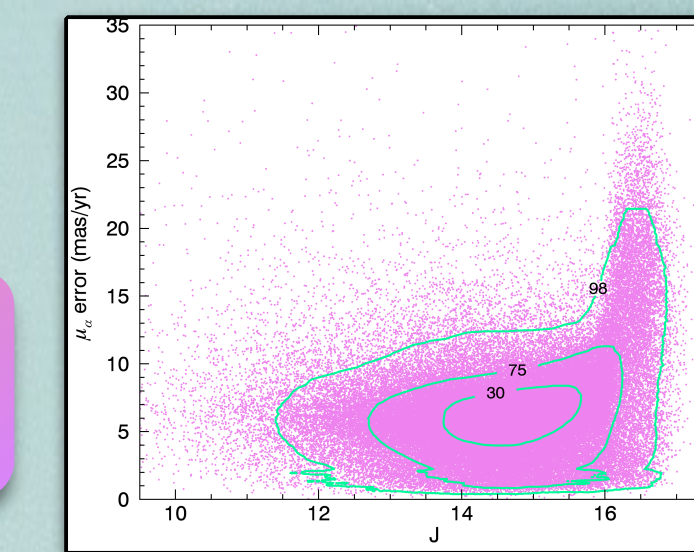BASS
Apex and Antapex
Solar Apex and Antapex
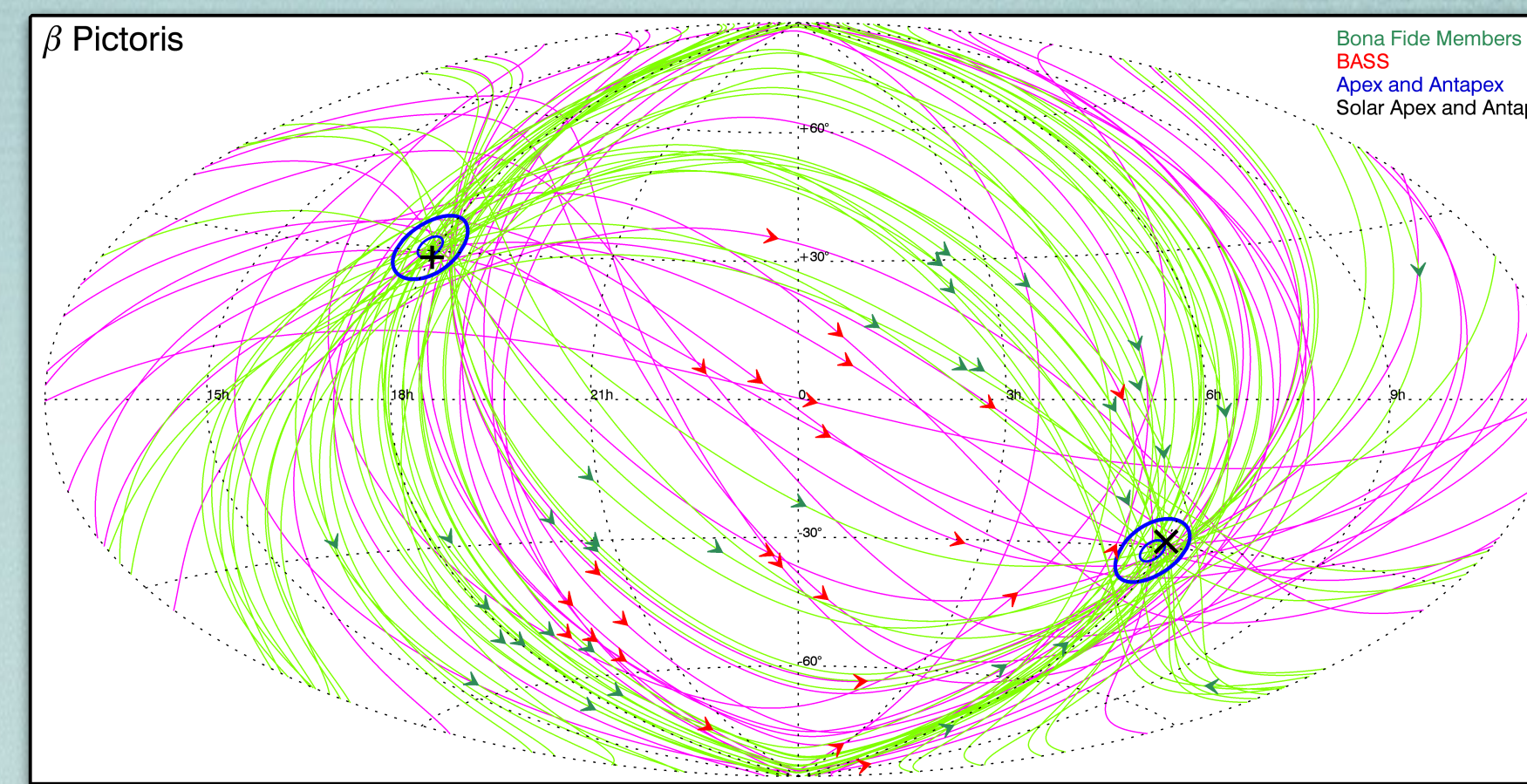
LEFT : Proper motion and sky position for bona fide members (green arrows) and BASS candidate members (pink arrows) of AB Doradus. Colored lines represent trajectories on the Celestial sphere (great circles). All members and candidates converge towards the apex of the moving group (blue circles; Gagné et al., 2014a).

LEFT : Histogram of spectral types for bona fide members (green) and the BASS sample (pink)

Right : Proper motion precision of our 2MASS / ALLWISE cross-match. Contours include 30, 75 and 98% of all objects.
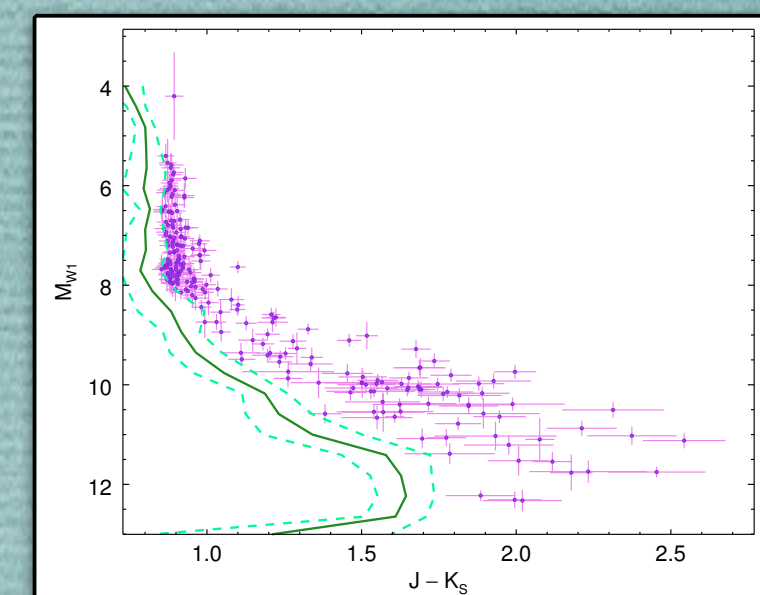
LEFT : UVW measurements for bona fide members of THA (green dots) compared to BANYAN II statistical predictions for BASS candidates (purple dots). The orange ellipsoid is our kinematic model.

Tucana-Horologium

RIGHT : Color-magnitude diagram for BASS candidates (purple points) compared with the field sequence (green) and its scatter (dashed lines). Young objects are expected to fall above the field sequence.
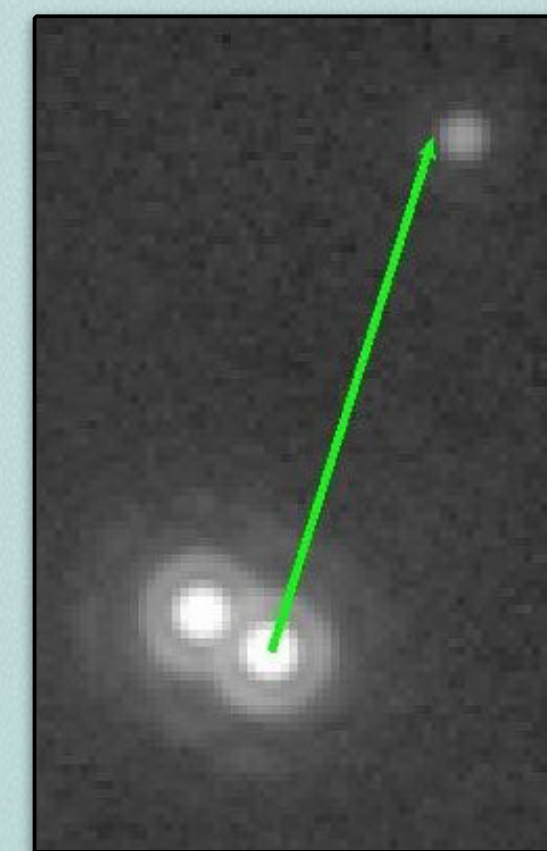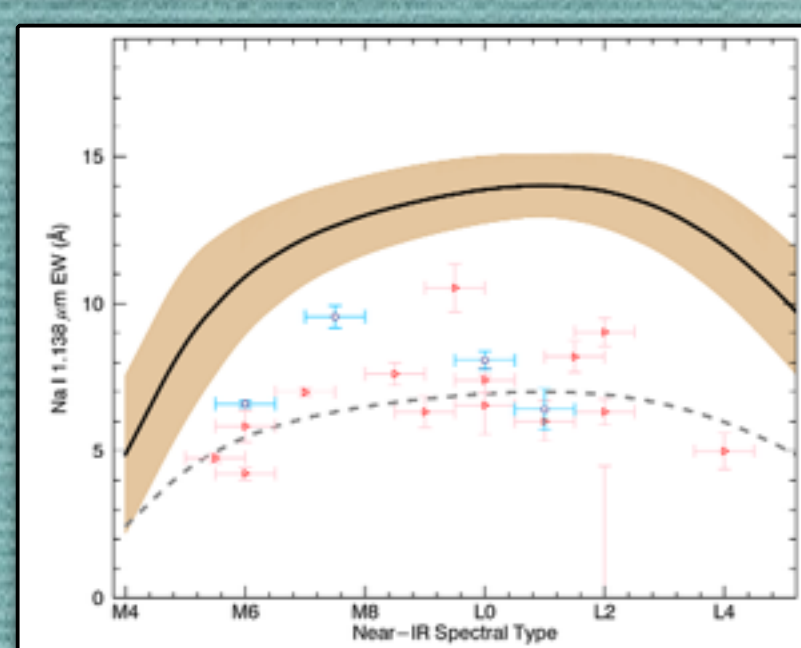
II : Exoplanet Imaging

- Compelling targets for direct imaging
- Young = bright, better contrast ratio
- Two ~ 10 - 13 M_{Jup} companions were found !
- Membership = Constraint on age

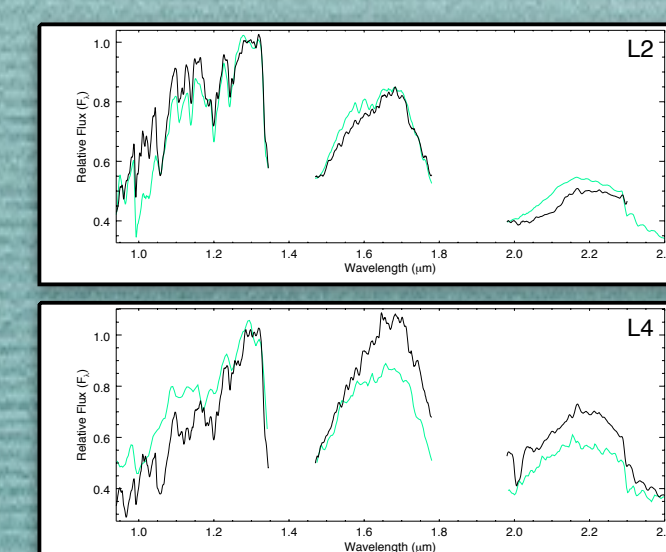UP : A new comoving, young ~13 M_{Jup} companion discovered in BASS !

LEFT : J0103-5515 was identified in BASS as a candidate member of Tucana-Horologium; a follow-up with NACO revealed it is a binary system with a 12-14 M_{Jup} companion (Delorme et al, 2013).

IV : Mass Segregation ?

Tentative evidence (1 - 4 σ) for spatial and dynamical mass segregation in some YMGs !

ABDMG

LEFT : The Minimum Spanning Tree (MST; green lines) for all members and high-priority candidate members of AB Doradus (red points and their projections). Vertical projection shadows are displayed as blue lines. A MST is the shortest network without loops that connects all points. The length of this MST gives a characteristic scale for the size of a distribution which is independent of geometry. Comparing the MST length of a fraction of the brightest stars with the same fraction of random stars provides a metric for mass segregation (Allison et al. 2009).
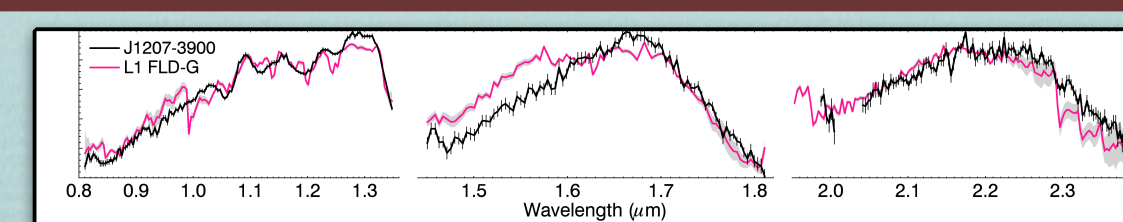
III : Spectroscopy

- We used GMOS, Flamingos-2, Spex, FIRE, GNIRS, OSIRIS to obtain 200+ new NIR and optical spectra
- We found several new young BDs and low-mass stars !

UP: The young TW Hydrae candidate J1207-3900 (black line) compared to a field L1 dwarf (pink line). This is the first L-type candidate member identified in TW Hydrae (Gagné et al., 2014b).

LEFT: Na I equivalent width (EW) for young BDs discovered in the BASS survey. The black line and beige region represent values for field BDs and their scatter. Low-gravity and very low-gravity BDs (blue and red symbols) display a lower-than-normal Na I EW. The dashed line delimits a region where BDs gain a larger score towards low-gravity (see Allers & Liu 2013)
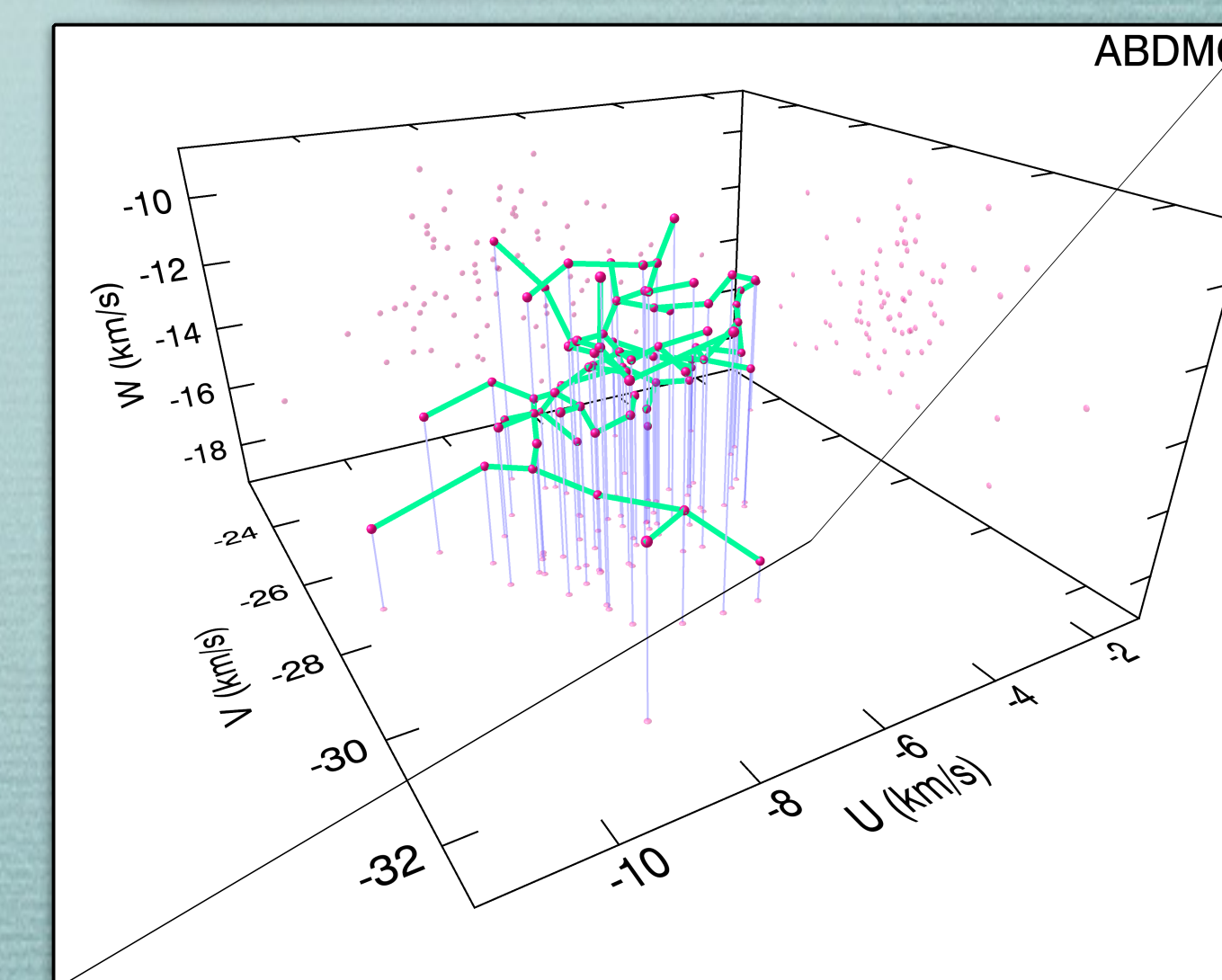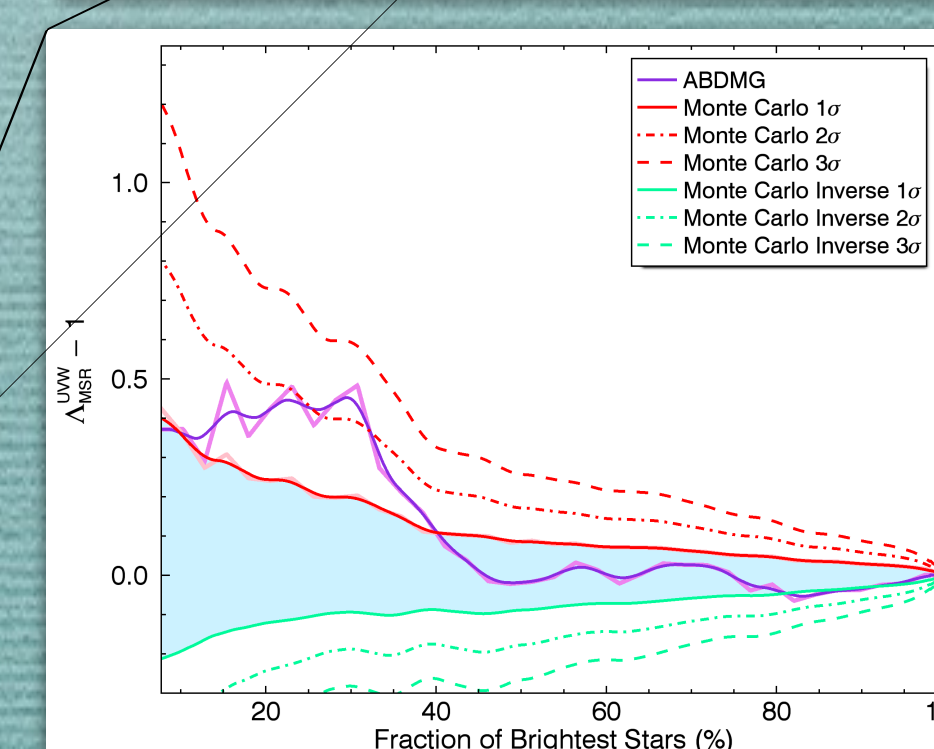
UP/LEFT: Some of the young BD discoveries from BASS (black) compared to field standards (green)

LEFT AND RIGHT : MST length for fractions of brightest YMG stars (purple), compared with random selections (red). Blue region is not statistically significant.