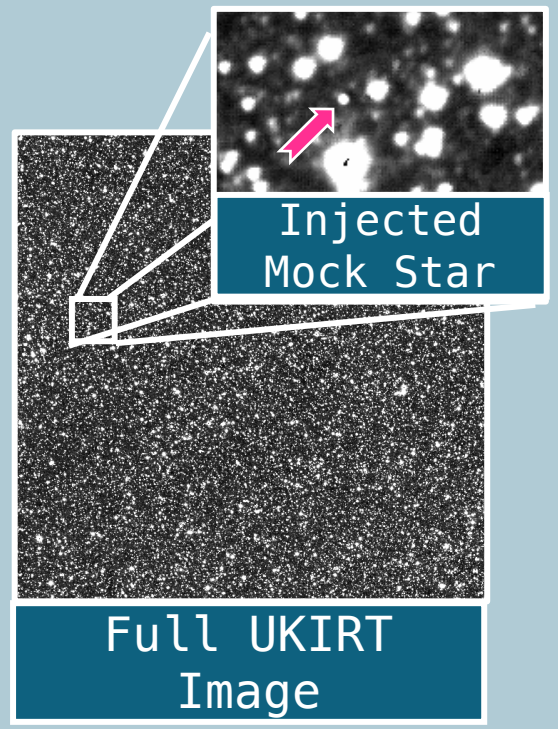
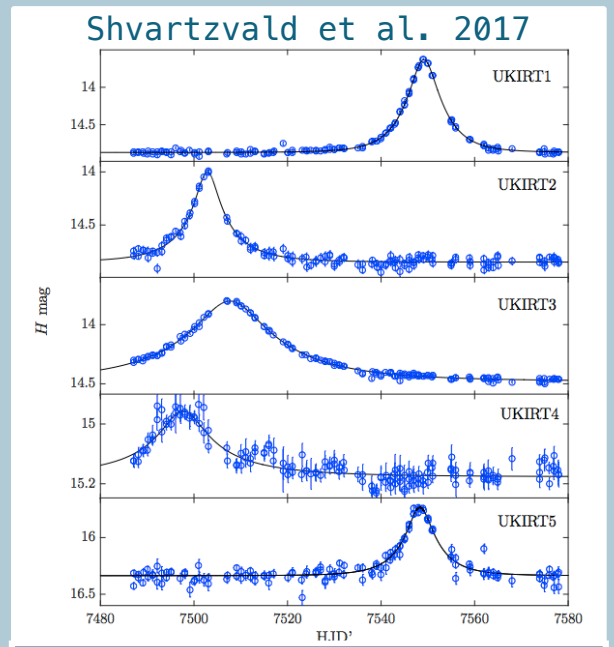
Mapping the Near-Infrared Microlensing Event Rate towards the Galactic Bulge with UKIRT

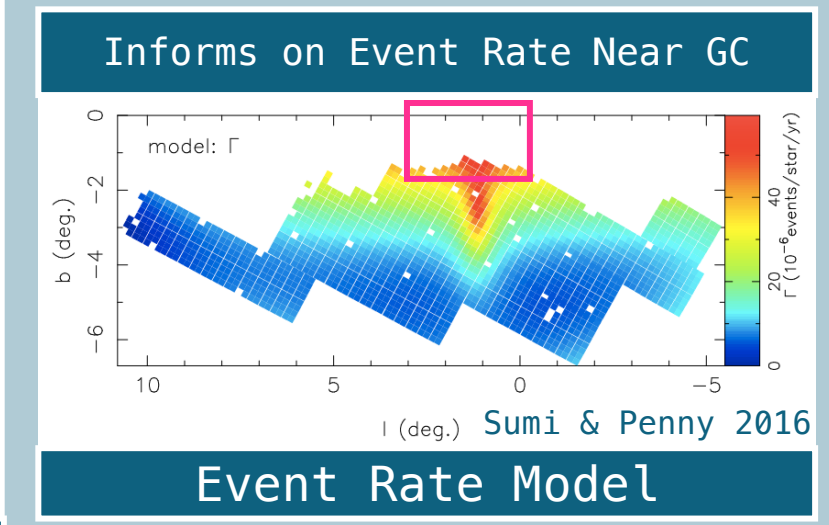
Savannah Jacklin, Geoff Bryden, Yossi Shvartzvald, Sebastiano Calchi Novati

UKIRT Microlensing Detection Efficiency Pipeline

UKIRT Images + PSF → Generate Mock Star with Flux Change and Magnification over Time → Inject Mock Star → Recover Light Curve From Mock → Study Parameter Space to Determine Detection Efficiency → Calculate Event Rate



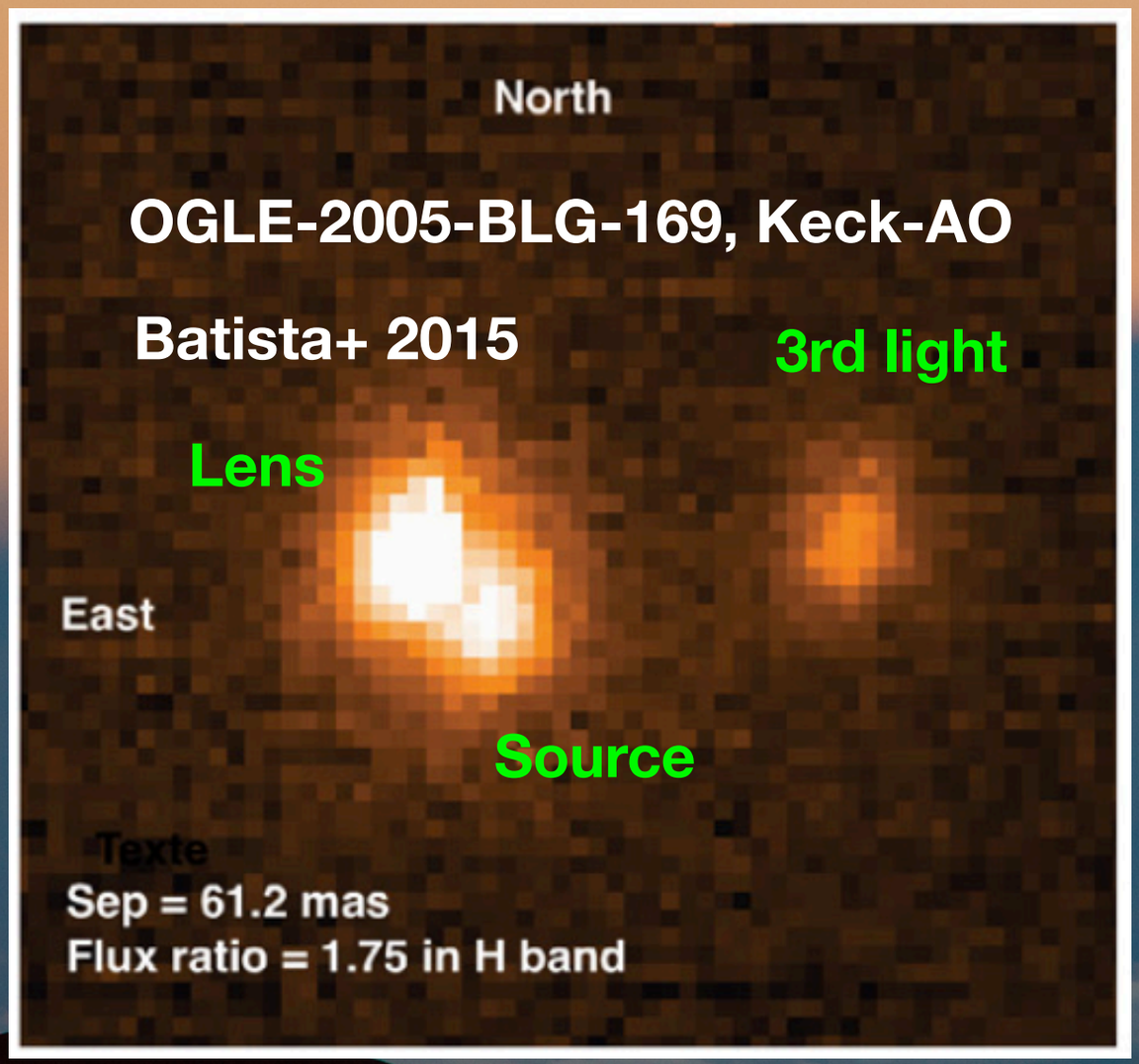




Following planetary microlensing with Subaru-AO

Lee, Chien-Hsiu / Subaru Telescope, NAOJ

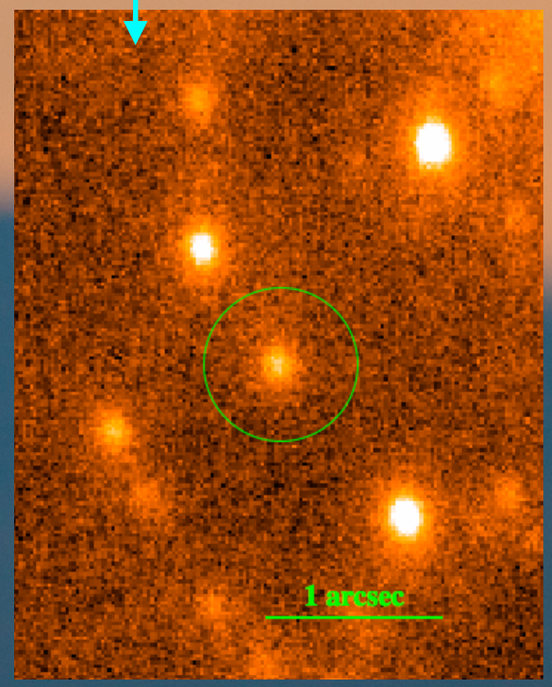
- Why we need high resolution imaging?



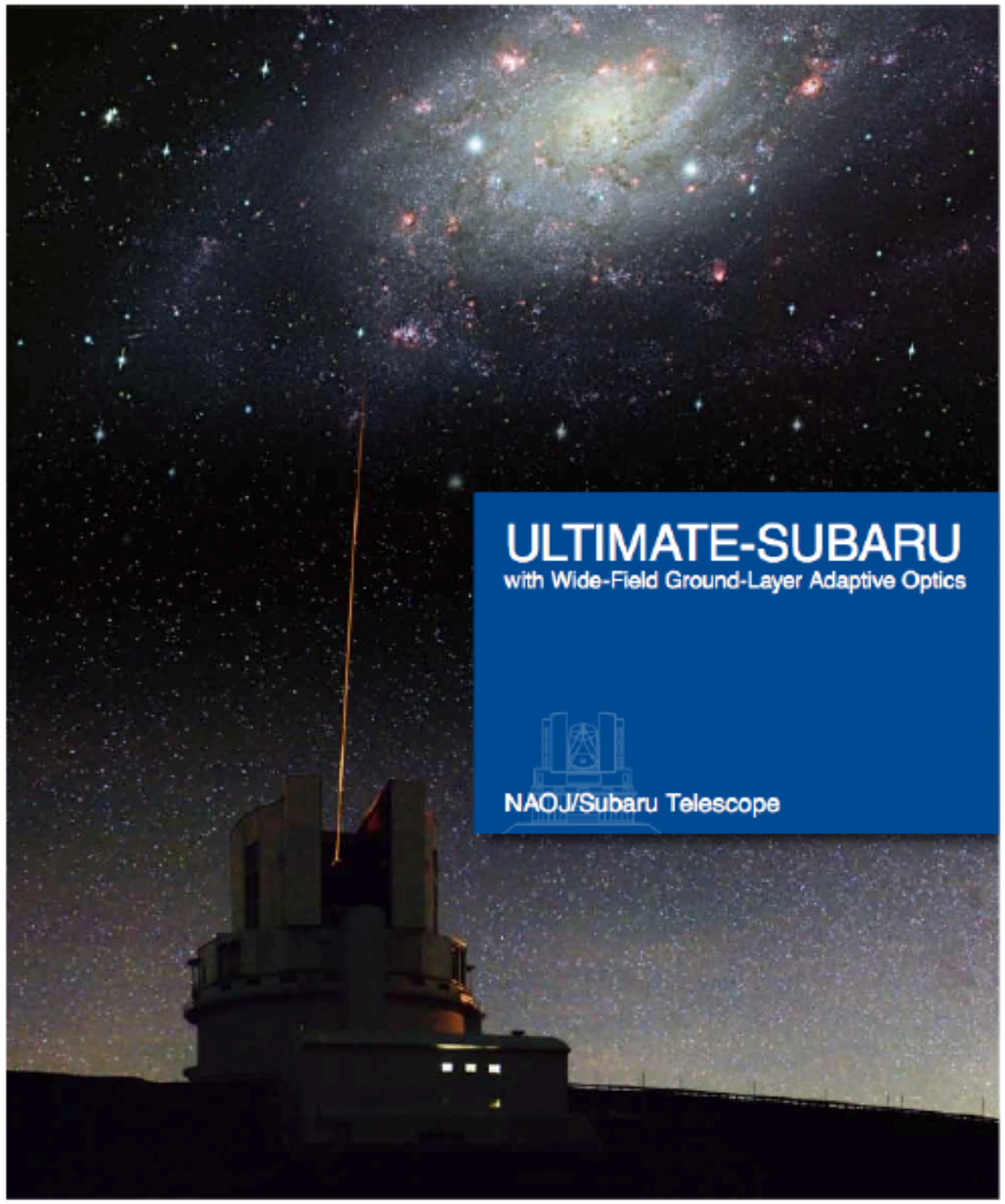
- Recent Subaru-AO follow-up:

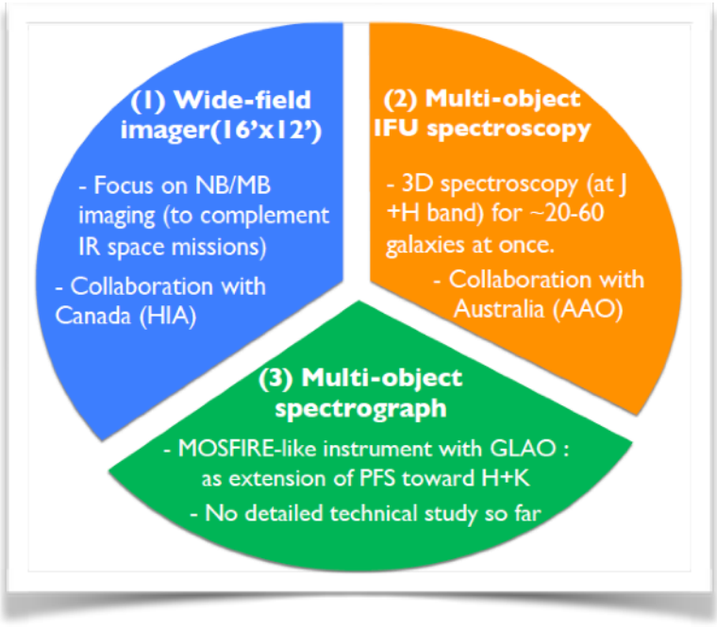
1. OGLE-2015-BLG-1395, 1649 in Sep. 2015

2. OGLE-2016-BLG-1067 in Jun. 2016

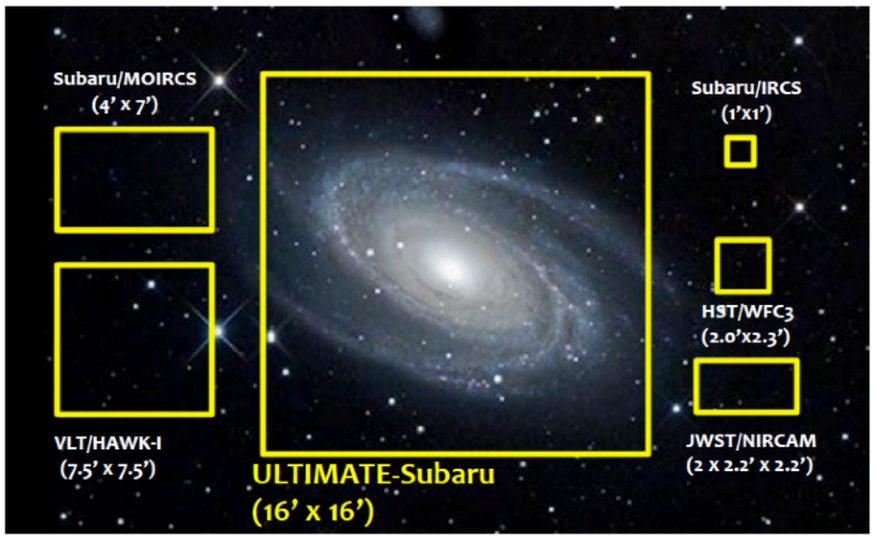


Ultra-wide-field Laser Tomographic Imager and MOS with AO for Transcendent Exploration by SUBARU Telescope





FoV comparison of NIR facilities in 2020s available at λ>2um



Fact sheet: https://www.naoj.org/Projects/newdev/ngao/20170316/materials/fact_sheet.pdf

Gravitational microlensing seen by Gaia Space Mission

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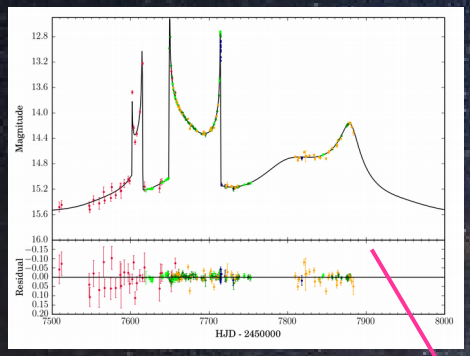
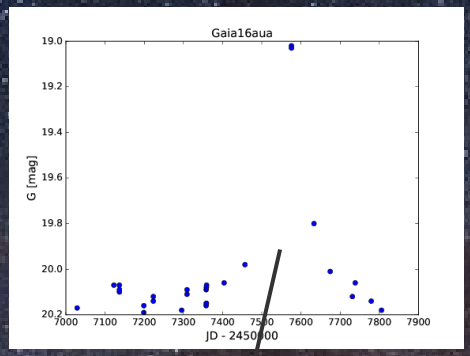
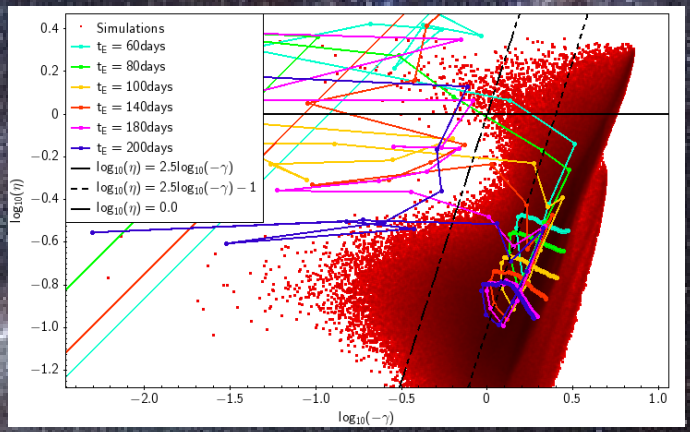
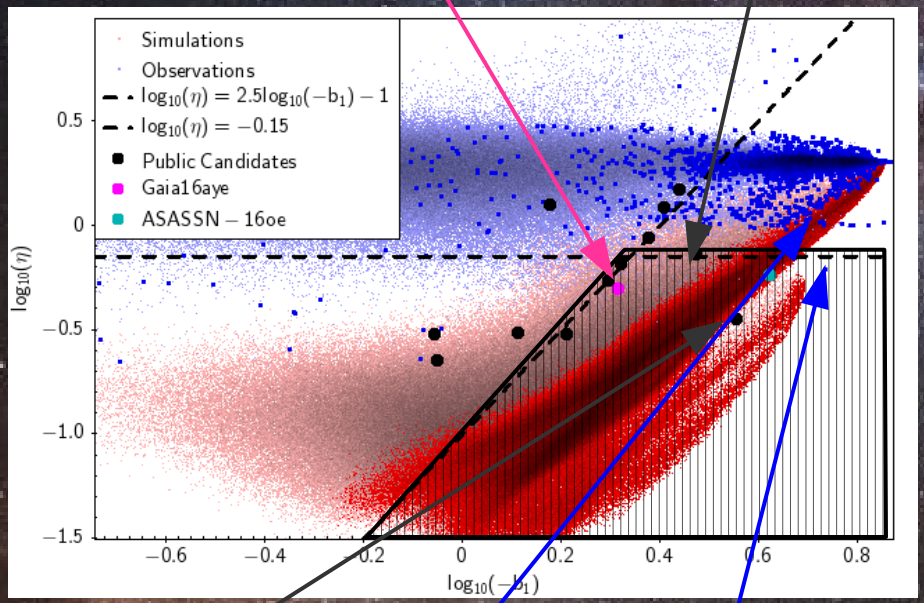
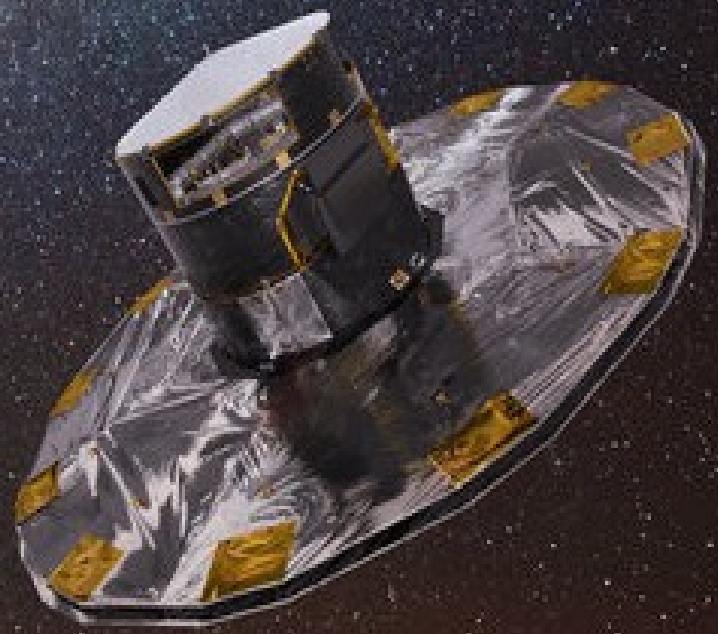
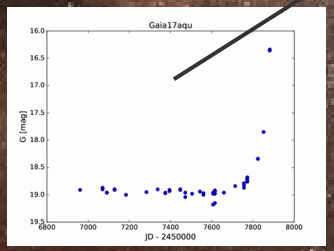


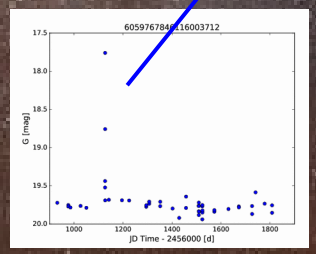


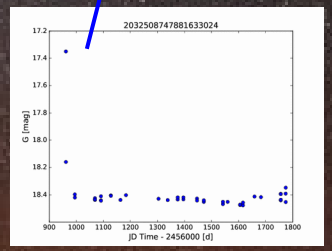






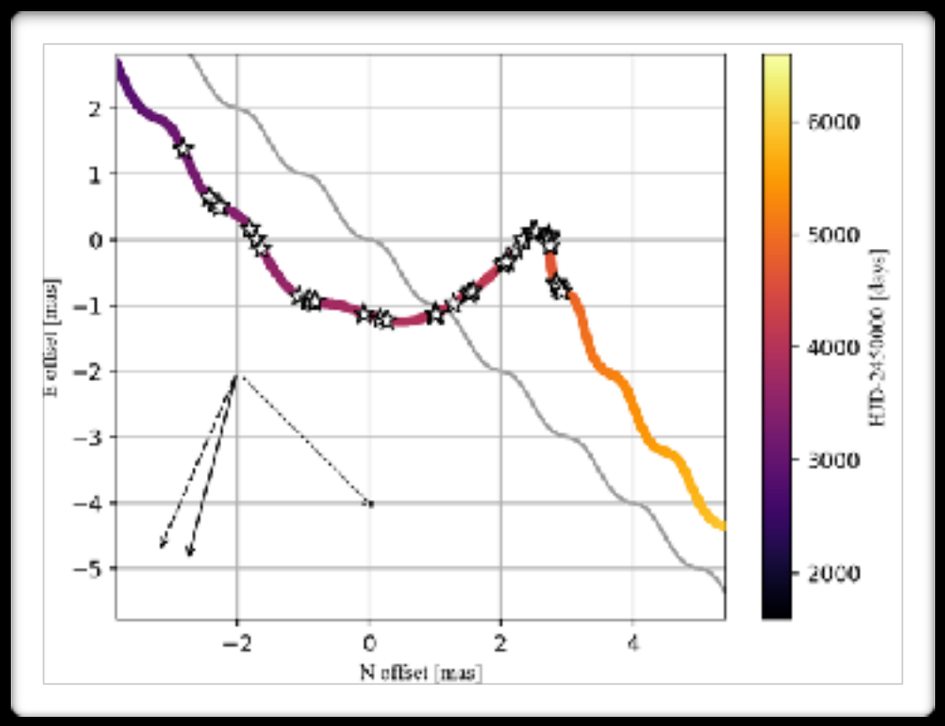


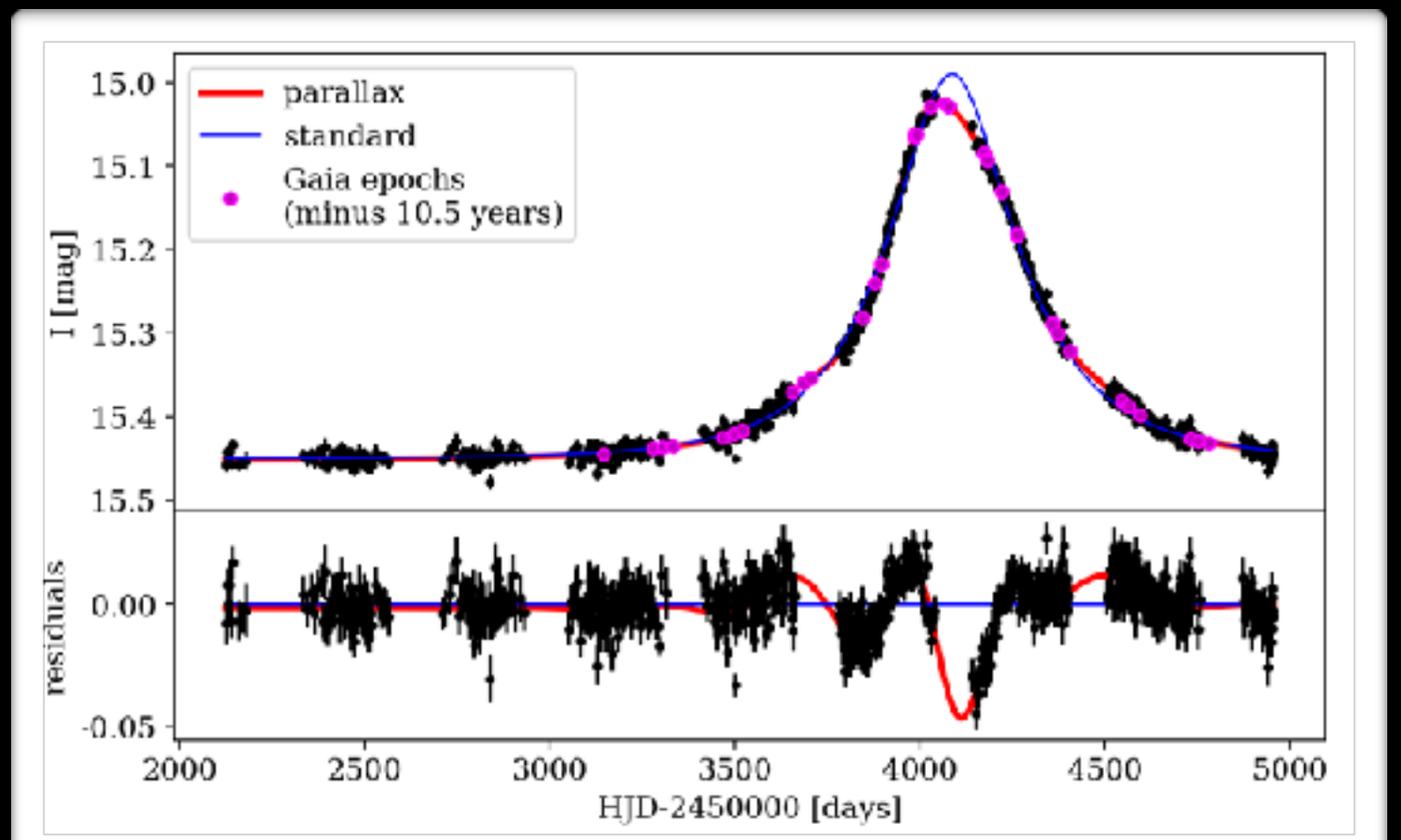




Astrometric microlensing with the Gaia satellite

Searching for Black Holes





Kris Rybicki
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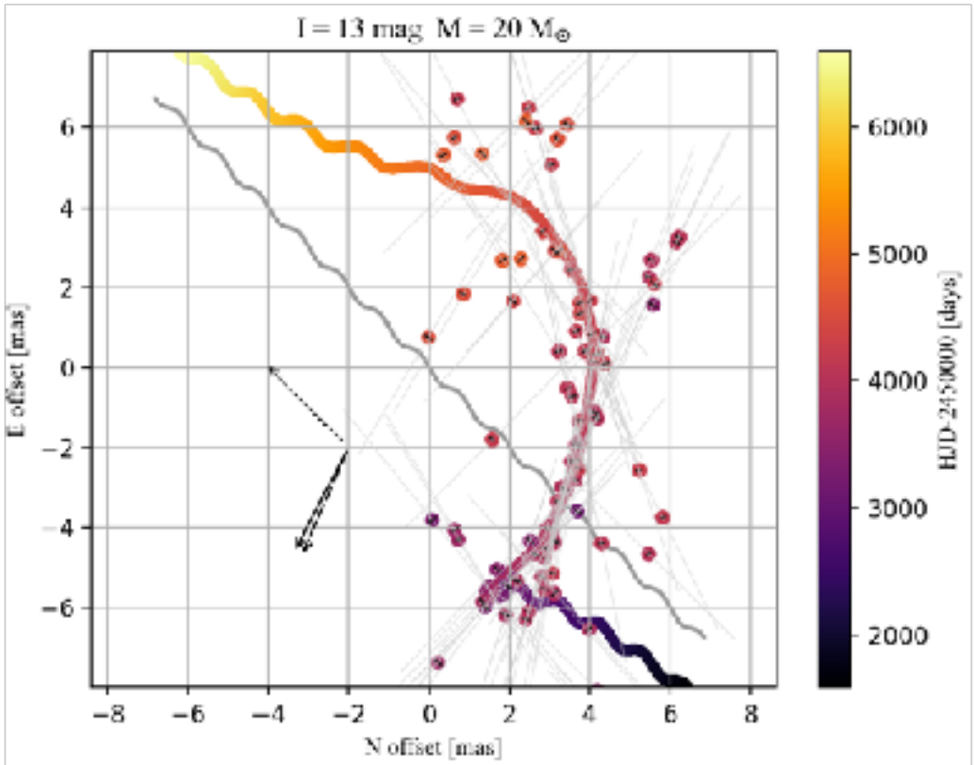
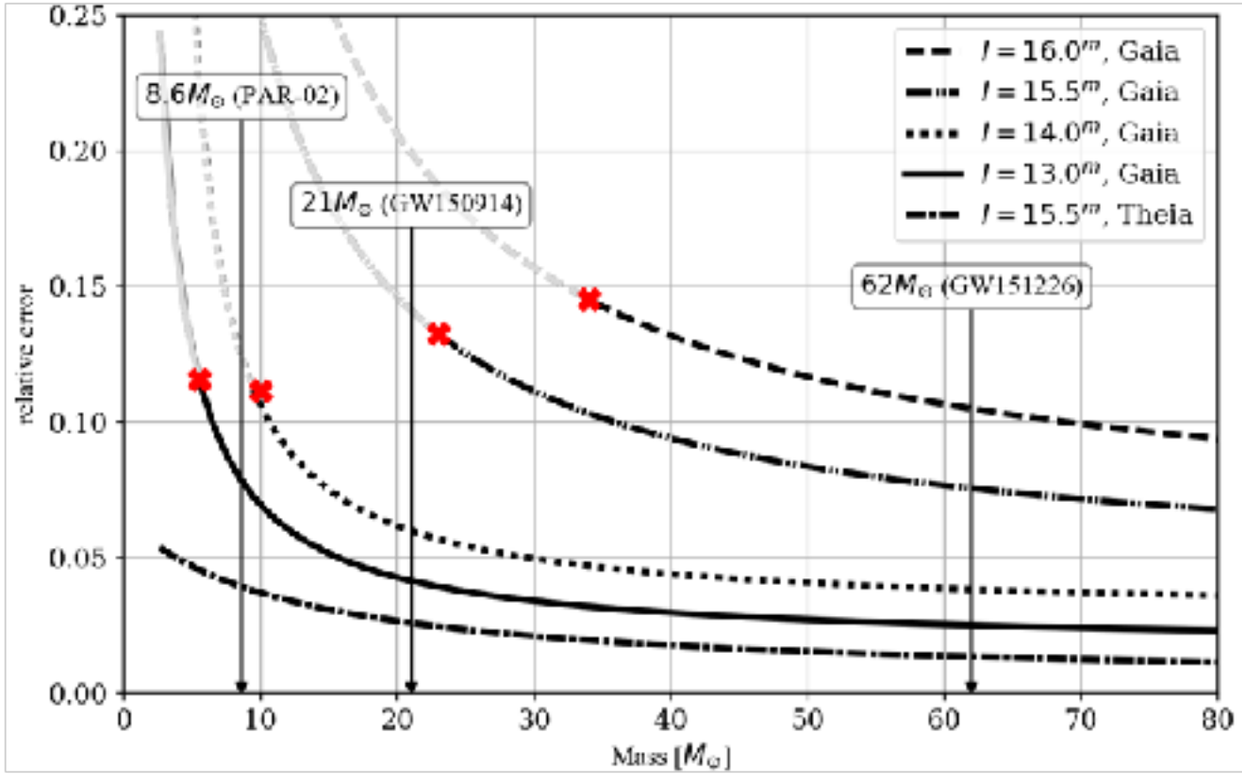
2017 Sagan Summer Workshop, Pasadena

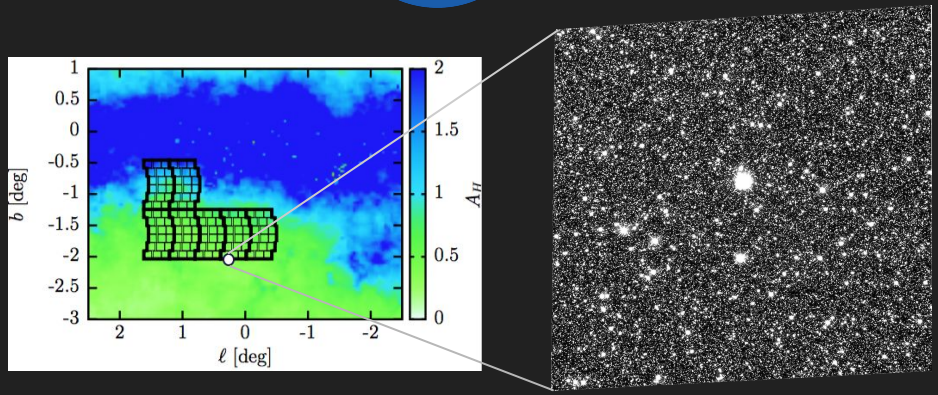
Microlensing is the only tool to observe (indirectly) and measure the mass of single stellar black holes !





A Deep Study of Stanek's Window as Precursor Science for the WFIRST Microlensing Field of Regard

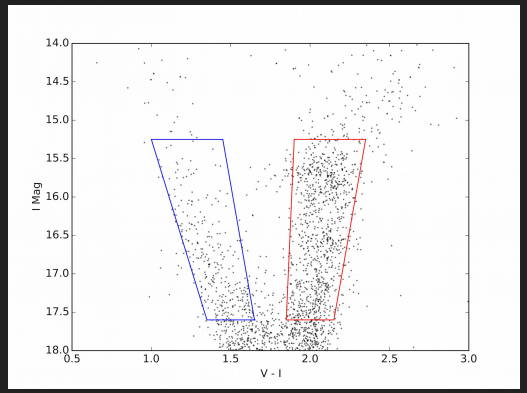
Sean Terry
Advisor: David Bennett



Multi-epoch HST WFC3 observations of Stanek's field centered at (l,b) = [0.25, -2.15]

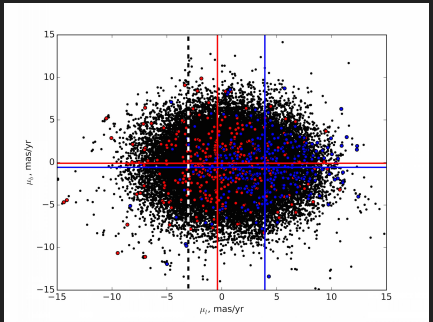
Field observed in 2010 (F555W, F814W, F110W, F160W) and 2012 (F814W).

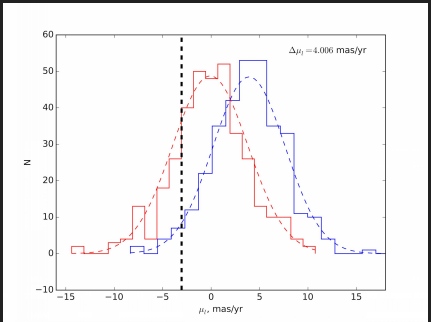
Proper-motion selection



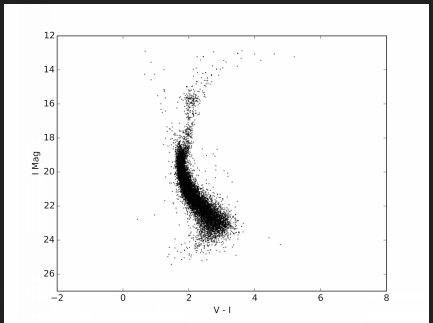
Foreground blue plume branch (left) and evolved bulge stars (left)

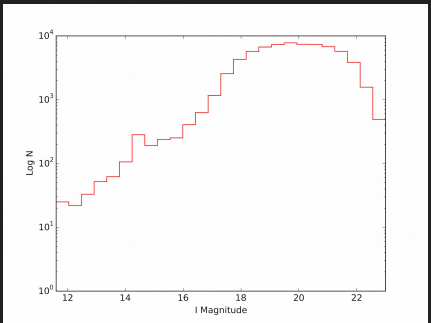
Cleaning and creating a pure bulge CMD/LF.



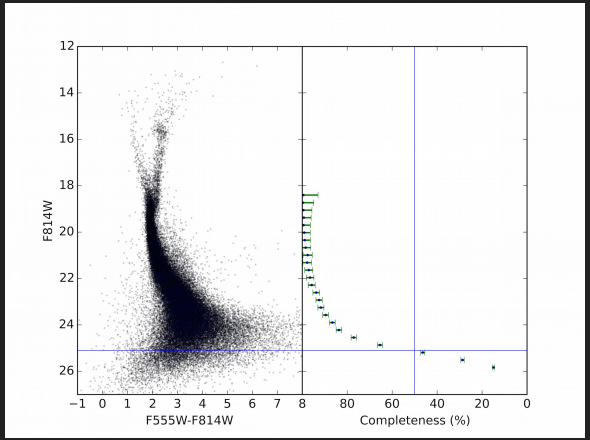


Bulge star centroid at (μ_l,μ_b) ≅ [0 mas/yr, 0 mas/yr] and disk star centroid at (μ_l,μ_b) = [4 mas/yr, 0 mas/yr]. PM cut at μ_l ≅ -3.0 mas/yr.





PM-selection results in color-mag diagram and luminosity function with approximately 2% contamination from non-bulge objects.



Comparing completeness corrections results across different reduction routines (DOLPHOT, img2xym.F)

Further work: Deeper channels (F110W, F160W) and microlensing event rate estimate in this field.