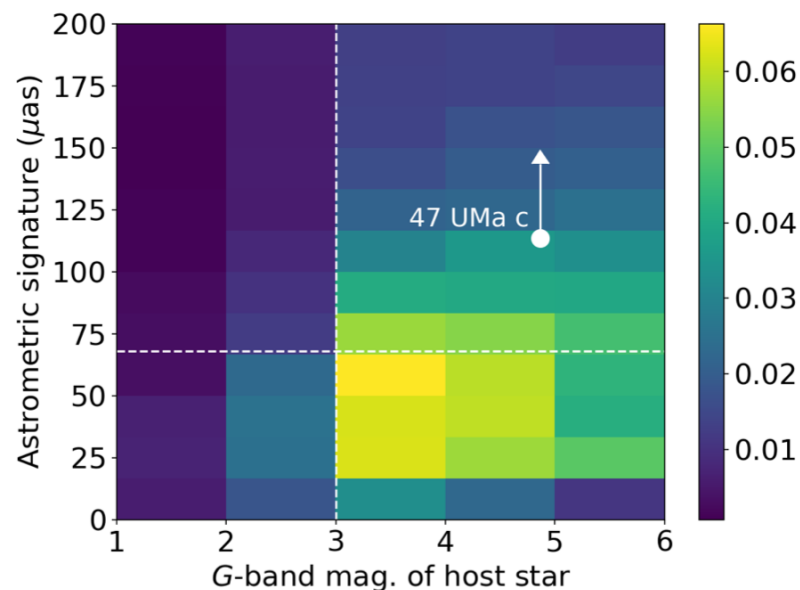


Exoplanet detection synergy between Gaia and the WFIRST Coronagraph

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- Future astrometric detections of exoplanets from the Gaia mission will augment and improve the sample of targets accessible to the Coronagraph Instrument (CGI) on WFIRST.
- We assessed the joint detection sensitivity of Gaia and WFIRST by modeling random planet populations around nearby ($d < 20$ pc), bright ($V < 6$) stars, and applying nominal detection thresholds for each mission.
- Our analysis suggests that only a small number of the new planet detections from Gaia will be favorable for spectroscopic characterization by WFIRST CGI: 1–3 planets, depending on the assumed planet population model.
- The target stars hosting gas giants detectable to both missions tend to be GK dwarfs with brightness between $V = 3–5$, and distances within 10 pc.
- While few in number, these new Gaia-detected exoplanets could be exceptionally valuable targets for WFIRST due to the ability to incorporate astrometric mass estimates into the spectral retrieval of atmospheric parameters.



Left: 2-D histogram of predicted astrometric signatures and host star G -band magnitudes, for bright, nearby stars ($d < 20$ pc). The horizontal white line denotes a nominal 70 microarcsec signature detection threshold; the vertical white line denotes a nominal minimum magnitude ($G = 3$) for target acquisition. The colorbar scale indicates the expected number of planets in each brightness-signature bin, based on the average of 1000 trials. As a reference point, the minimum astrometric signature of a known radial velocity planet observable with WFIRST CGI, 47 UMa c, is indicated by the white dot.

HIP	NAME	d(pc)	V mag	Spec Type	Score
3765	___	7.45	5.74	K1V	0.033
96100	sig Draconis	5.75	4.67	G9.0V	0.033
1551082	Eridani	6.04	4.26	G8.0V	0.031
16537	eps Eridani	3.21	3.71	K2.0V	0.030
7981	___	7.53	5.24	K1V	0.030
8102	tau Ceti	3.65	3.49	G8.5V	0.029
99240	delta Pavonis	6.11	3.53	G8.0IV	0.027
99825	___	8.91	5.72	K3V	0.026
61317	beta CVn	8.44	4.24	G0V	0.026

Left: “Top 10” target stars, ranked by the number of expected planets detectable by both WFIRST and Gaia