TABLE 1
Model Comparison

AICc Qualitative Comparison	Free Parameters	N_{free}	N_{data}	RMS	$\ln \mathcal{L}$	BIC	AICc	ΔAICc
AICc Favored Model	K_b, e_c, K_c, σ, γ	18	235	2.86	-585.02	1245.32	1186.22	0.00
Nearly Indistinguishable	e_b, K_b, e_c, K_c, σ, γ	20	235	2.85	-583.32	1252.84	1187.57	1.35
Ruled Out	K_b, K_c, σ, γ	16	235	3.05	-600.70	1265.77	1212.91	26.69
	e_b, K_b, K_c, σ, γ	18	235	3.04	-598.64	1272.57	1213.47	27.25
	e_b, K_b, σ, γ	15	235	3.32	-614.00	1286.91	1237.21	50.99
	K_b, σ, γ	13	235	3.34	-617.22	1282.43	1239.10	52.88
	e_c, K_c, σ, γ	15	235	5.14	-726.69	1512.29	1462.59	276.37
	K_c, σ, γ	13	235	5.36	-736.37	1520.74	1477.41	291.19
	σ, γ	10	235	5.52	-743.22	1518.04	1484.43	298.21
	e_b, K_b, e_c, K_c, γ	15	235	2.90	-1198.56	2456.04	2406.34	1220.12
	K_b, e_c, K_c, γ	13	235	2.91	-1214.95	2477.88	2434.55	1248.33
	e_b, K_b, K_c, γ	13	235	3.06	-1329.82	2707.63	2664.30	1478.08
	K_b, K_c, γ	11	235	3.07	-1342.92	2722.91	2686.04	1499.82
	e_b, K_b, γ	10	235	3.33	-1525.95	3083.52	3049.91	1863.69
	K_b, γ	8	235	3.35	-1553.09	3126.88	3099.84	1913.62
	e_c, K_c, γ	10	235	5.15	-3599.50	7230.61	7197.00	6010.78
	K_c, γ	8	235	5.41	-3844.08	7708.85	7681.81	6495.59
	γ	5	235	5.55	-4101.42	8207.16	8190.12	7003.90

TABLE 2
MCMC POSTERIORS

Parameter	Credible Interval	Maximum Likelihood	Units
Modified MCMC Step Parameters			
P_b	$38.1354^{+0.0054}_{-0.0053}$	38.1356	days
$T\mathrm{conj}_{\mathrm{b}}$	$2458981.42^{+0.64}_{-0.63}$	2458981.47	BJD
$T\mathrm{peri}_{\mathrm{b}}$	$2458982.2^{+4.1}_{-5.0}$	2458982.3	BJD
e_b	$0.065^{+0.05}_{-0.043}$	0.084	
ω_b	$1.8^{+0.88}_{-0.68}$	1.74	radians
K_b	6.39 ± 0.28	6.48	m s^{-1}
P_c	$759.9^{+4.3}_{-11.0}$	764.0	days
$T\mathrm{conj}_{\mathrm{c}}$	2458544 ± 130	2458545	BJD
$T\mathrm{peri}_{\mathrm{c}}$	2458263^{+720}_{-18}	2458251	BJD
e_c	$0.628^{+0.09}_{-0.097}$	0.633	
ω_c	$-1.35^{+0.42}_{-0.39}$	-1.4	radians
K_c	$2.96^{+0.56}_{-0.5}$	3.05	m s^{-1}
Orbital Parameters			
P_b	$38.1354^{+0.0054}_{-0.0053}$	38.1356	days
$T\mathrm{conj}_{\mathrm{b}}$	$2458981.42^{+0.64}_{-0.63}$	2458981.47	BJD
$T\mathrm{peri}_{\mathrm{b}}$	$2458982.2^{+4.1}_{-5.0}$	2458982.3	BJD
e_b	$0.065^{+0.05}_{-0.043}$	0.084	
ω_b	$1.8^{+0.88}_{-0.68}$	1.74	radians
K_b	6.39 ± 0.28	6.48	m s^{-1}
P_c	$759.9^{+4.3}_{-11.0}$	764.0	days
$T\mathrm{conj}_{\mathrm{c}}$	2458544 ± 130	2458545	BJD
$T\mathrm{peri}_{\mathrm{c}}$	2458263^{+720}_{-18}	2458251	BJD
e_c	$0.628^{+0.09}_{-0.097}$	0.633	
ω_c	$-1.35^{+0.42}_{-0.39}$	-1.4	radians
K_c	$2.96^{+0.56}_{-0.5}$	3.05	m s^{-1}
Other Parameters			
γ_{HRS}	$1.8^{+1.3}_{-1.4}$	2.2	m s-1
$\gamma_{\mathrm{HIRES-pre}}$	$0.58^{+0.86}_{-0.84}$	0.36	m s-1
$\gamma_{\mathrm{HIRES-post}}$	$1.55^{+0.4}_{-0.41}$	1.8	m s-1
$\gamma_{\mathrm{CARMENES}}$	$1.98^{+0.52}_{-0.56}$	2.21	m s-1
γ_{APF}	-2.56 ± 0.35	-2.51	m s-1
$\dot{\gamma}$	$\equiv 0.0$	$\equiv 0.0$	m s^{-1} d^{-1}
$\ddot{\gamma}$	$\equiv 0.0$	$\equiv 0.0$	m s^{-1} d^{-2}
σ_{HRS}	$2.6e-07^{+5.3e-06}_{-2.5e-07}$	$1e-09$	m s^{-1}
$\sigma_{\mathrm{HIRES-pre}}$	$3.45^{+0.77}_{-0.62}$	2.89	m s^{-1}
$\sigma_{\mathrm{HIRES-post}}$	$3.03^{+0.28}_{-0.25}$	3.02	m s^{-1}
$\sigma_{\mathrm{CARMENES}}$	$1.86^{+0.42}_{-0.36}$	1.57	m s^{-1}
σ_{APF}	$2.35^{+0.31}_{-0.26}$	2.21	m s^{-1}

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Reference epoch for γ,$\dot{\gamma}$,$\ddot{\gamma}$: 2454819.303792802

TABLE 3
DERIVED POSTERIORS

Parameter	Credible Interval	Maximum Likelihood	Units
$M_b \sin i$	18.73 ± 0.86	18.65	$M_\oplus$
a_b	0.1658 ± 0.0012	0.1651	AU
$M_c \sin i$	18.2 ± 2.7	17.9	$M_\oplus$
a_c	$1.216^{+0.011}_{-0.013}$	1.217	AU

TABLE 4
Summary of Priors

e_b constrained to be < 0.99
e_c constrained to be < 0.99
K constrained to be > 0
Bounded prior: $0.0 < \sigma_{\rm HRS} < 10.0$
Bounded prior: $0.0 < \sigma_{\rm HIRES-pre} < 10.0$
Bounded prior: $0.0 < \sigma_{\rm HIRES-post} < 10.0$
Bounded prior: $0.0 < \sigma_{\rm APF} < 10.0$
Bounded prior: $0.0 < \sigma_{\rm CARMENES} < 10.0$

TABLE 5
Final Convergence Criterion

Criterion	Final Value
minAfactor	40.225
maxArchange	0.007
maxGR	1.010
minTz	2940.721

TABLE 6
Radial Velocities

Time (JD)	RV (m s^{-1})	RV Unc. (m s^{-1})	Inst.
2452394.96200	-2.01	2.22	HRS
2452395.92500	-3.60	2.60	HRS
2452396.93600	-1.40	2.87	HRS
2452400.92000	3.80	2.88	HRS
2452403.86900	1.37	2.29	HRS
2450603.96526	-4.78	1.26	HIRES-pre
2450956.06549	1.77	1.55	HIRES-pre
2450982.97728	-3.78	1.30	HIRES-pre
2451013.87879	-2.19	1.24	HIRES-pre
2451312.03638	3.35	1.35	HIRES-pre
2451368.79752	-1.03	1.13	HIRES-pre
2451439.74500	-7.10	1.68	HIRES-pre
2451704.95738	-5.35	1.42	HIRES-pre
2452007.02947	-12.48	1.56	HIRES-pre
2452009.07728	-14.59	1.54	HIRES-pre
2452061.91263	-3.78	1.84	HIRES-pre
2452062.93524	-2.34	1.55	HIRES-pre
2452094.85344	-0.75	1.23	HIRES-pre
2452096.89412	-6.43	1.36	HIRES-pre
2452097.98221	-4.73	1.16	HIRES-pre
2452127.91859	-5.74	1.61	HIRES-pre
2452133.73683	-2.52	1.61	HIRES-pre
2452160.87175	-3.36	1.73	HIRES-pre
2452161.82115	-5.29	1.93	HIRES-pre
2452162.78727	-3.88	1.64	HIRES-pre
2452445.98836	7.04	1.68	HIRES-pre
2452537.74268	-0.29	1.96	HIRES-pre
2452713.11322	5.73	1.13	HIRES-pre
2452806.02729	-10.28	1.54	HIRES-pre
2452850.90107	-0.37	1.62	HIRES-pre
2453179.98512	4.54	1.35	HIRES-pre
2453479.06598	7.91	0.68	HIRES-post
2453549.85695	6.57	0.60	HIRES-post
2453604.88099	0.24	0.70	HIRES-post
2453838.10913	3.96	0.81	HIRES-post
2453932.90509	4.32	0.79	HIRES-post
2453960.87274	-2.38	0.97	HIRES-post
2453961.81970	-0.47	0.96	HIRES-post
2453981.78930	10.03	0.67	HIRES-post
2453982.90441	2.25	1.05	HIRES-post
2453983.83115	3.69	0.73	HIRES-post
2453984.88750	-2.33	0.75	HIRES-post
2454248.02256	0.00	1.06	HIRES-post
2454248.99047	-0.06	1.15	HIRES-post
2454249.94473	0.30	0.98	HIRES-post
2454252.03197	0.19	0.97	HIRES-post
2454255.92349	-4.67	0.71	HIRES-post
2454277.85088	1.08	1.01	HIRES-post
2454278.89615	-0.41	1.10	HIRES-post
2454279.93333	0.39	1.13	HIRES-post

Note. — Only the first 50 of 235 RVs are displayed in this table. Use `radvel table -t rv` to save the full LaTeX table as a separate file.

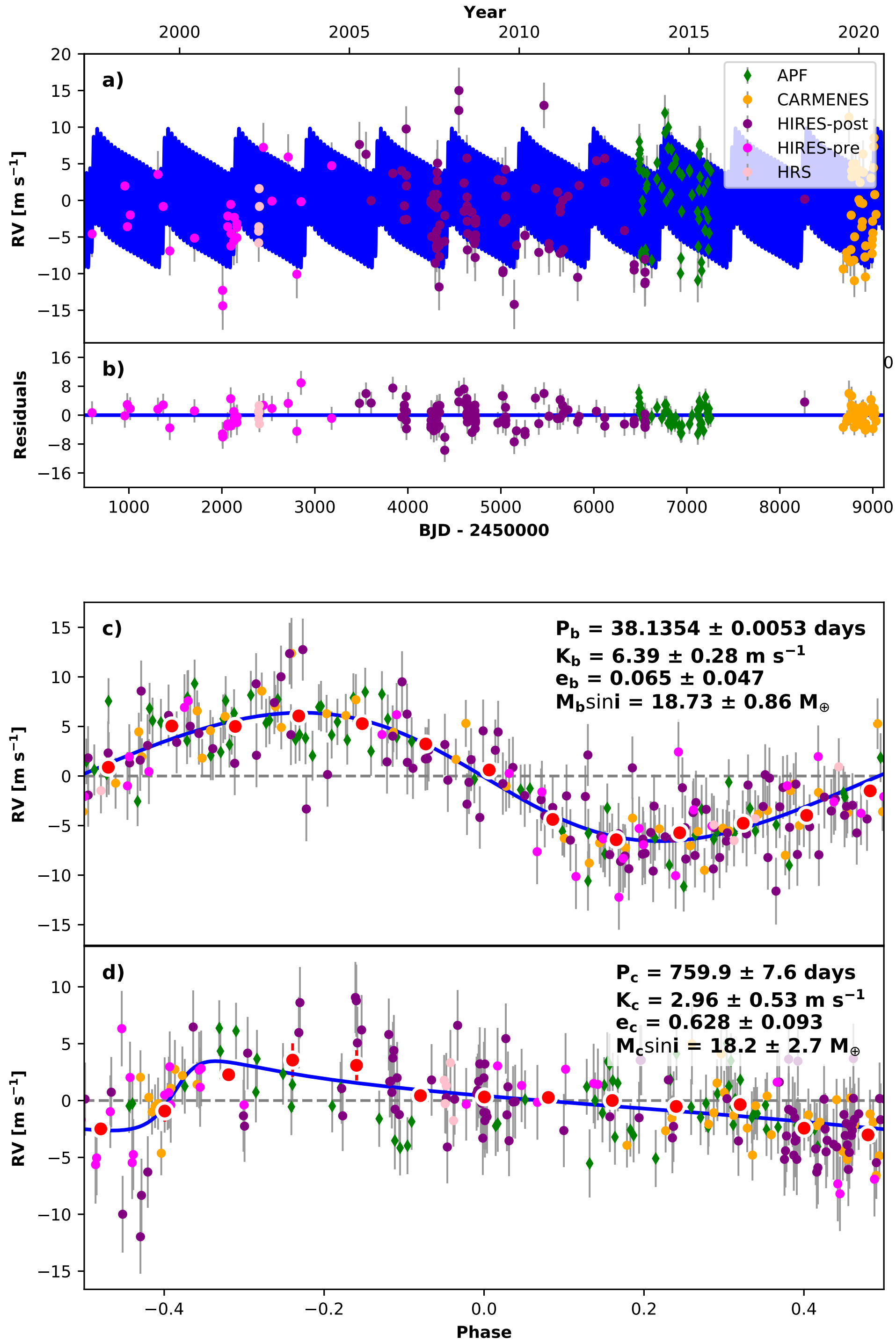

Fig. 1.— Best-fit 2-planet Keplerian orbital model for GJ687. The maximum likelihood model is plotted while the orbital parameters listed in Table 2 are the median values of the posterior distributions. The thin blue line is the best fit 2-planet model. We add in quadrature the RV jitter term(s) listed in Table 2 with the measurement uncertainties for all RVs. **b)** Residuals to the best fit 2-planet model. **c)** RVs phase-folded to the ephemeris of planet b. The Keplerian orbital models for all other planets (if any) have been subtracted. The small point colors and symbols are the same as in panel **a**. Red circles (if present) are the same velocities binned in 0.08 units of orbital phase. The phase-folded model for planet b is shown as the blue line.

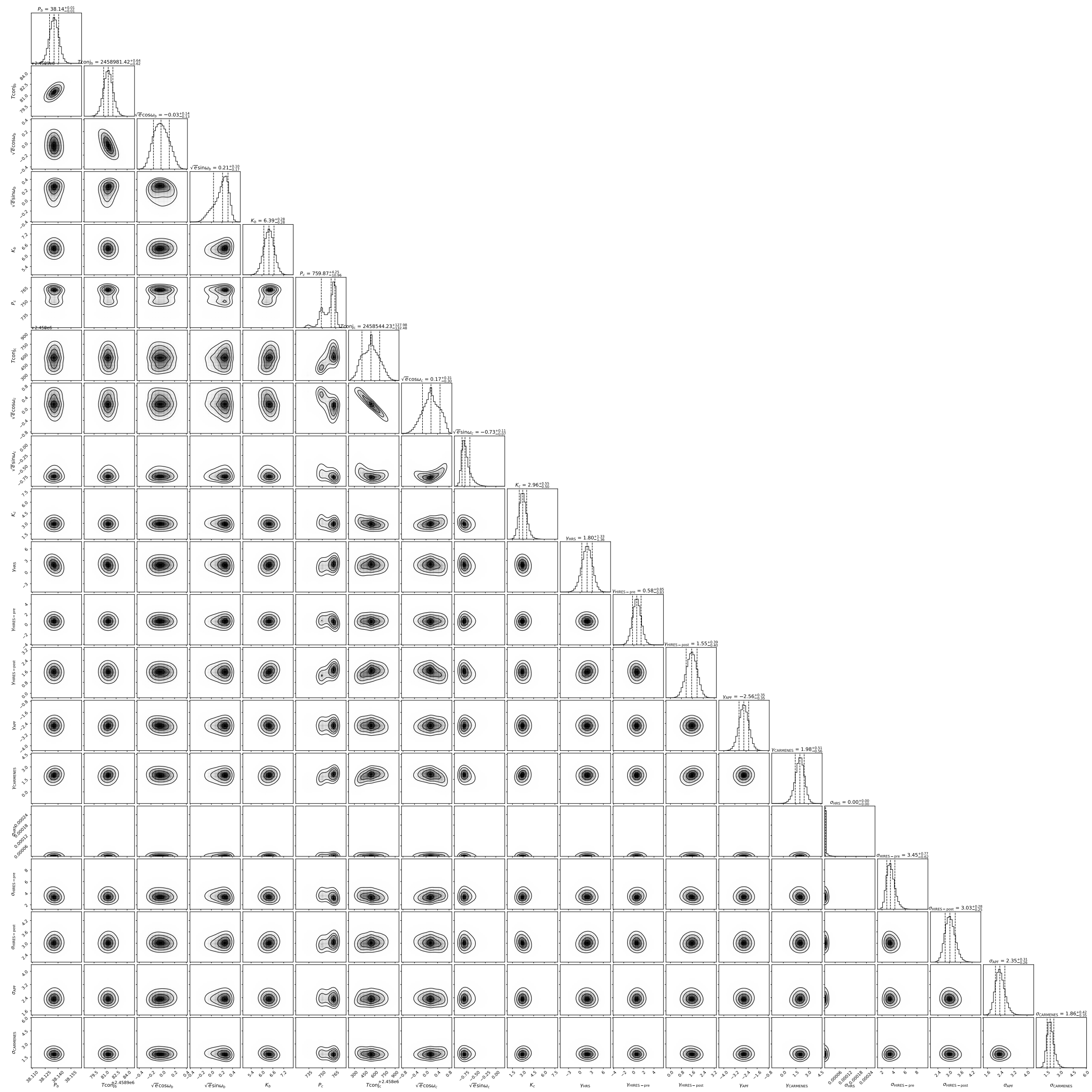

FIG. 2.— Posterior distributions for all free parameters.

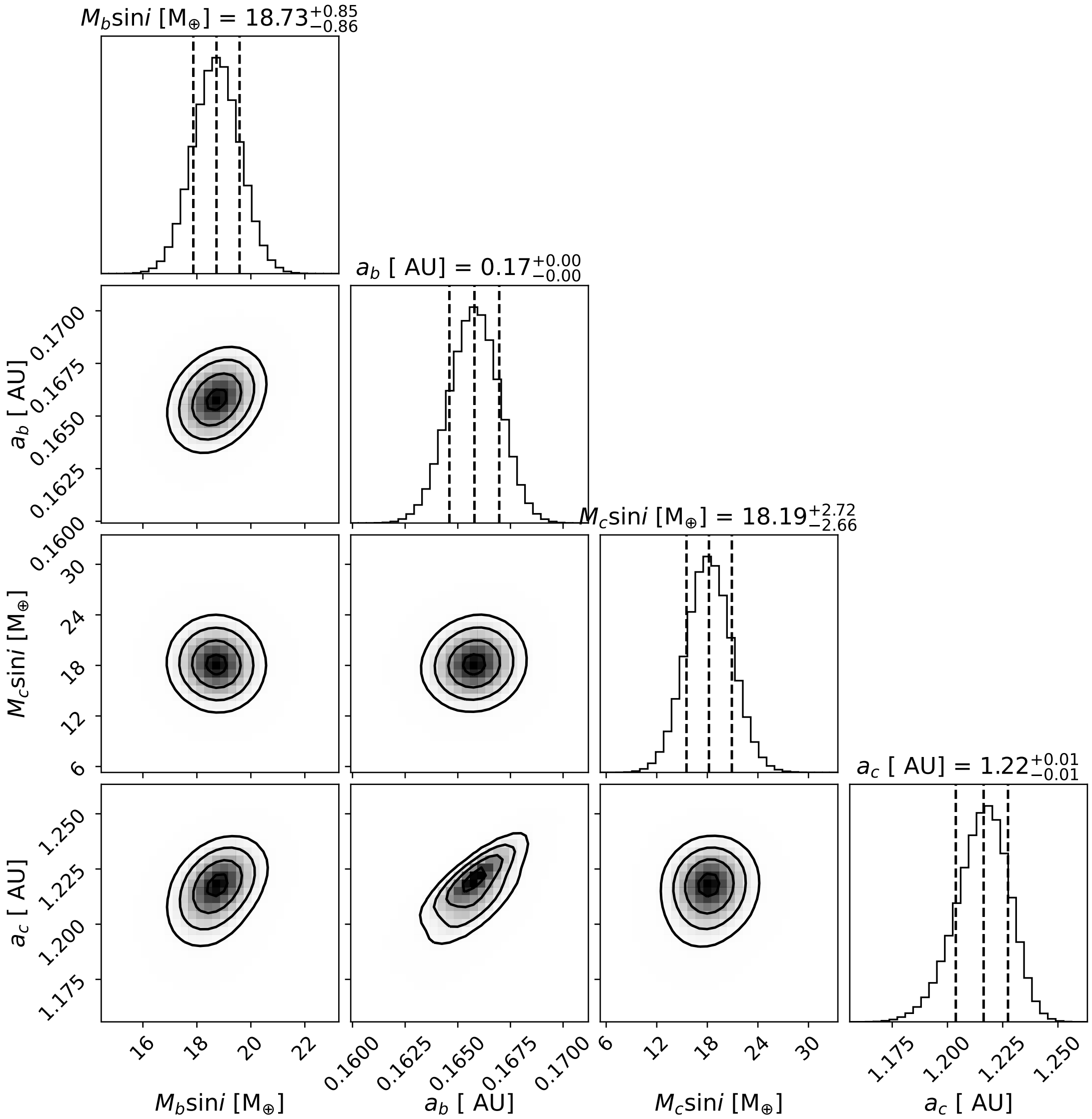

FIG. 3.— Posterior distributions for all derived parameters.