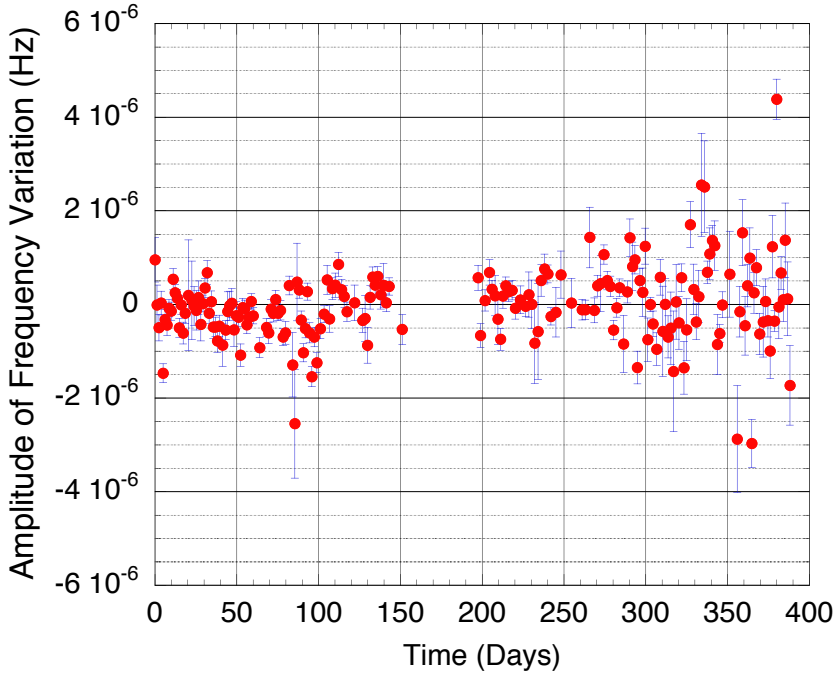
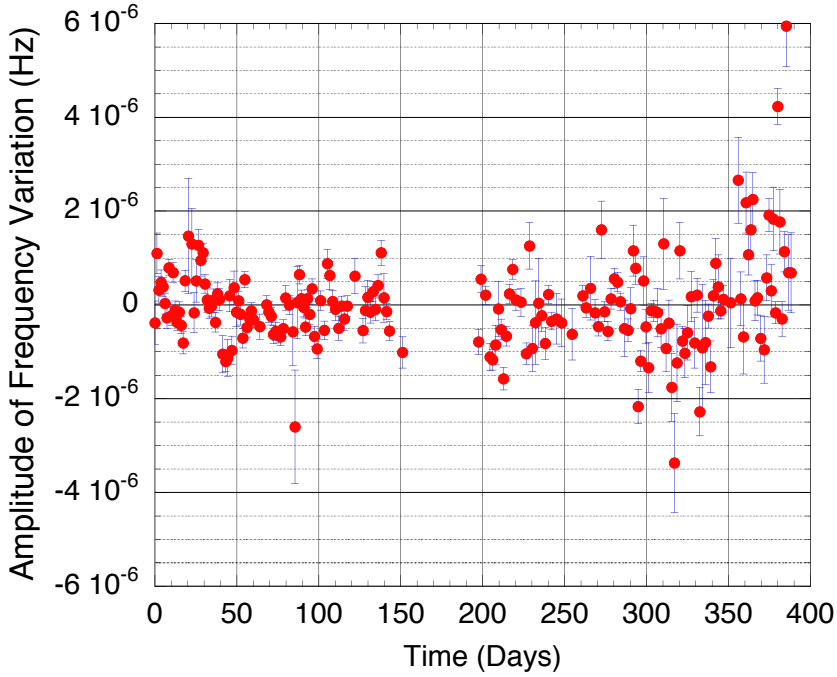
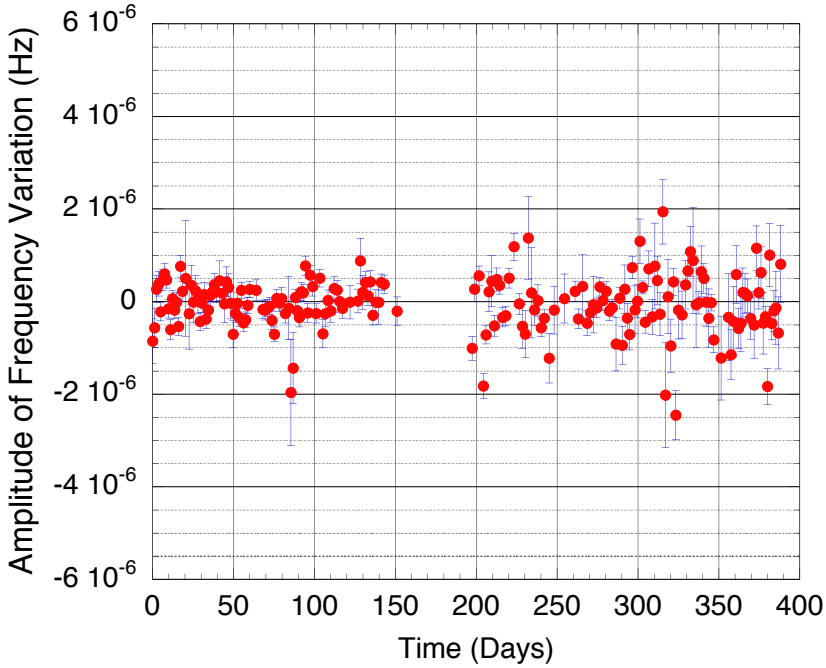
Supplementary Figures



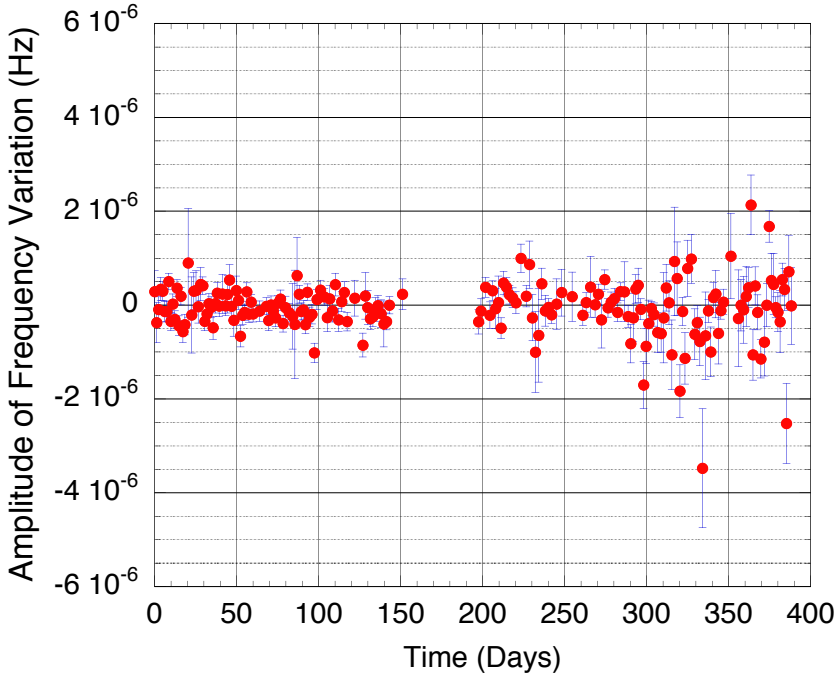
Supplementary Figure 1: **Subset fits to sidereal amplitude** $CC_{\omega_\oplus}$ from equation (3) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



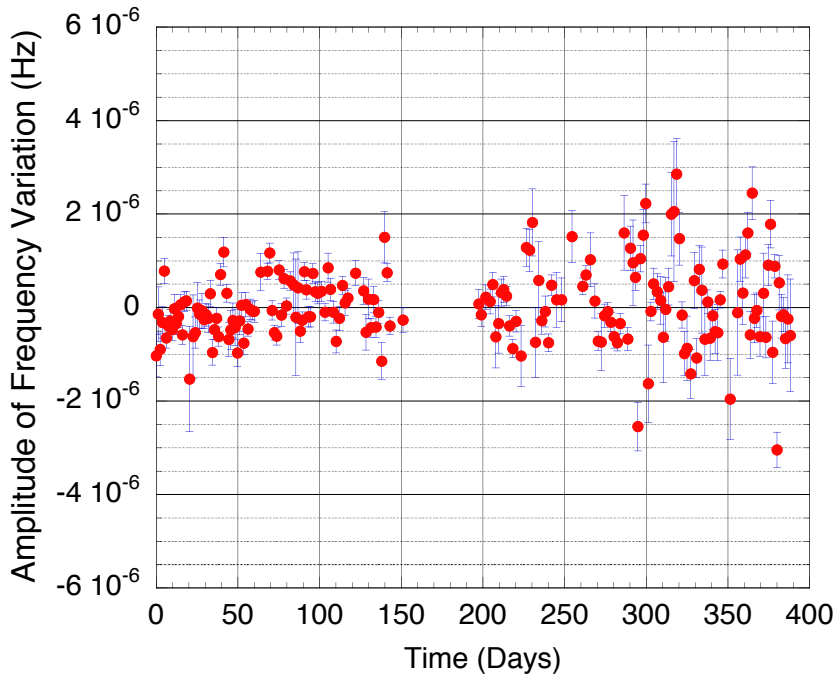
Supplementary Figure 2: **Subset fits to sidereal amplitude** $CS_{\omega_\oplus}$ from equation (3) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



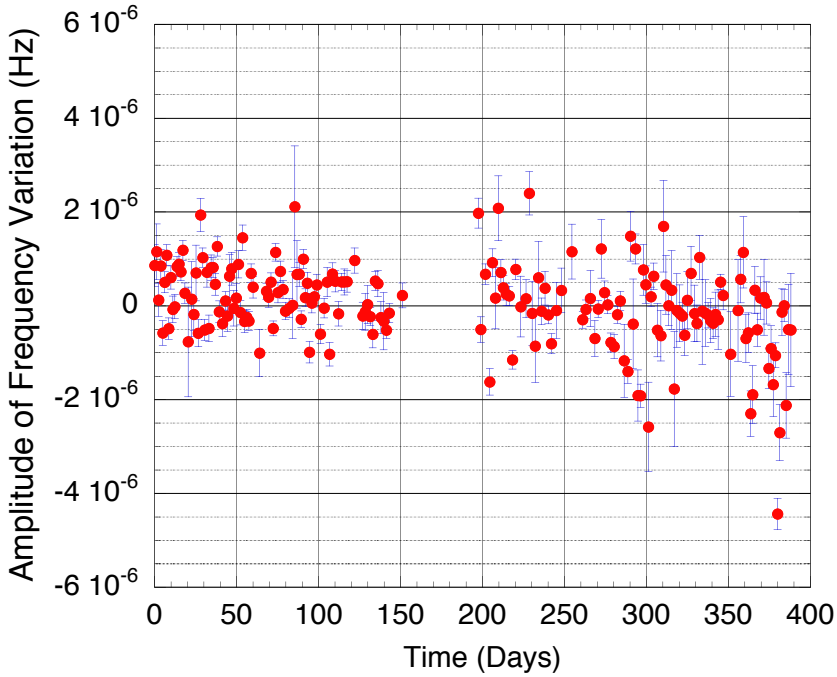
Supplementary Figure 3: **Subset fits to sidereal amplitude** $CC_{2\omega_\oplus}$ from equation (3) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



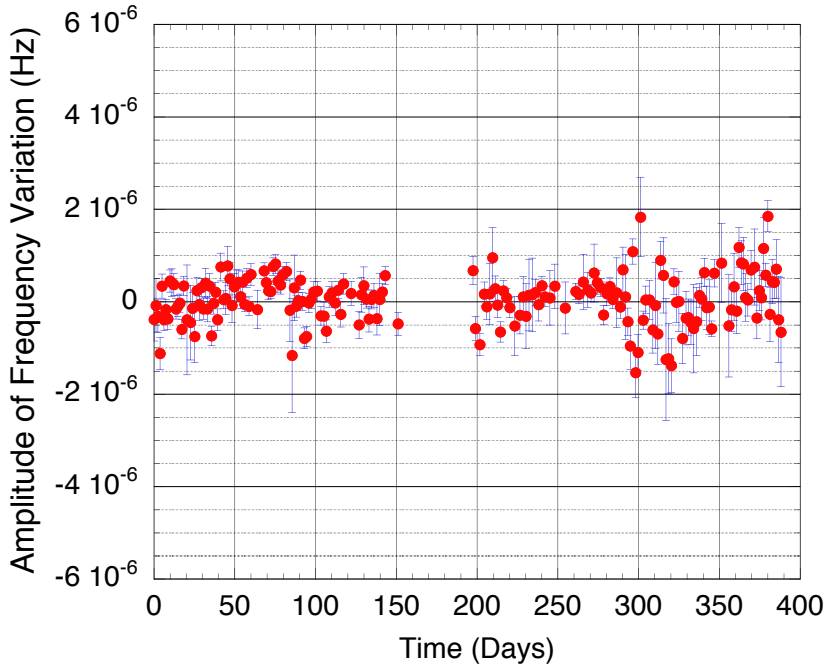
Supplementary Figure 4: **Subset fits to sidereal amplitude** $CS_{2\omega_\oplus}$ from equation (3) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



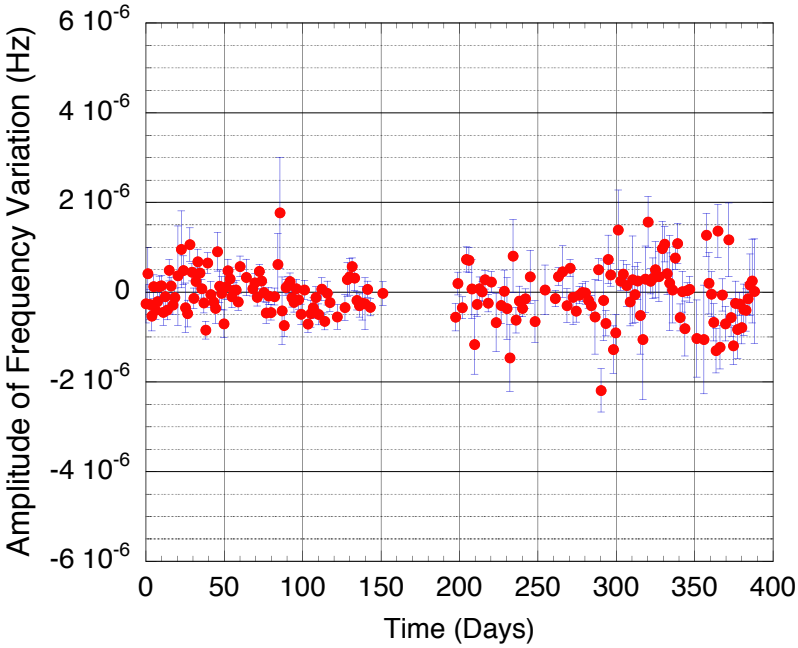
Supplementary Figure 5: **Subset fits to sidereal amplitude** $SC_{\omega_\oplus}$ from equation (4) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



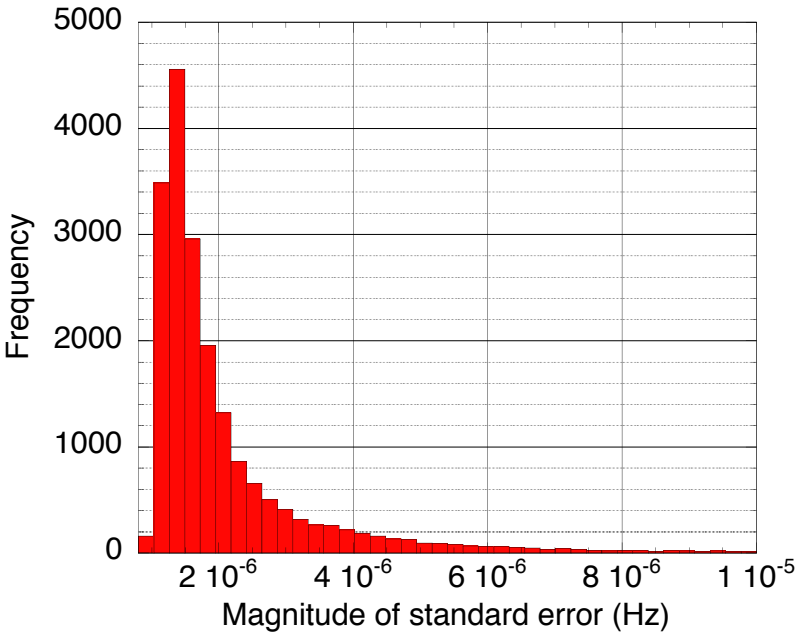
Supplementary Figure 6: **Subset fits to sidereal amplitude** $SS_{\omega_\oplus}$ from equation (4) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



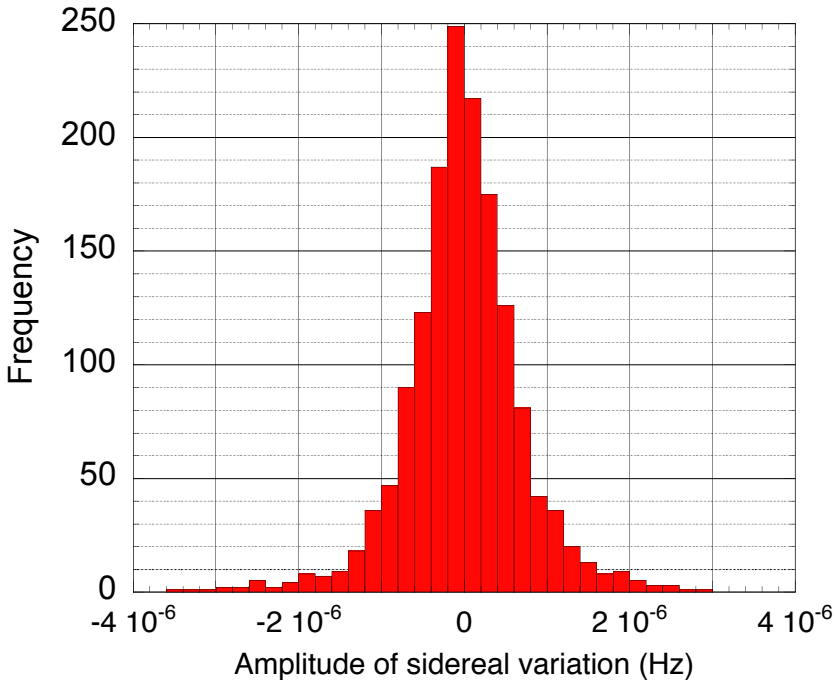
Supplementary Figure 7: **Subset fits to sidereal amplitude** $SC_{2\omega_\oplus}$ from equation (4) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



Supplementary Figure 8: **Subset fits to sidereal amplitude** $SS_{2\omega_\oplus}$ from equation (4) obtained as discussed in the main text. Statistical 1σ error bars are shown in blue.



Supplementary Figure 9: **Statistical histogram of the magnitude of the standard errors** for fits to the amplitudes of the $2\omega_R$ components of equation (2) in the main text. Values are from fits to subsets of data ∼1000 seconds (10 rotations) long.



Supplementary Figure 10: **Statistical histogram of amplitudes for $\omega_\oplus$ and $2\omega_\oplus$ variations**, given by the 8 time-varying components of equations (3) and (4) in the main text. Values are from fits to subsets of data ∼1.2 days long.

Supplementary Tables

Supplementary Table 1: **Historical overview of Michelson-Morley style experiments**, constraining Lorentz invariance in electrodynamics as presented in Figure (1) of the main text.

Year	Type	$\Delta c/c$ or $\Delta\nu/\nu$	Reference
1881	Interferometer	8.3E-9	[1]
1887	Interferometer	9.1E-10	[2]
1904	Interferometer	2.3E-10	[3]
1924	Interferometer	1.2E-9	[4]
1925	Interferometer	1.4E-9	[5]
1926	Interferometer	5E-10	[6]
1927	Interferometer	1E-10	[7]
1930	Interferometer	4.8E-11	[8]
1955	Cavities	1E-10	[9]
1964	Interferometer	1E-11	[10]
1969	Interferometer	8.1E-10	[11]
1979	Cavities	4E-15	[12]
2003	Cavities	3.4E-14	[13]
2003	Cavities	1E-15	[14]
2003	Cavities	4.3E-15	[15]
2004	Cavities	1.1E-15	[16]
2005	Cavities	2.6E-16	[17]
2005	Cavities	5E-17	[18]
2006	Cavities	8E-17	[19]
2009	Cavities	1E-17	[20]
2009	Cavities	1E-17	[21]
2014	Cavities	1E-18	This work

Supplementary Table 2: **Amplitudes of Cosine / Sine frequency components of interest and their sensitivities and numerical weights**, calculating using the following values: $F_{1,2}$ describe combinations of electric and magnetic filling factors in the cavities (∼0.46,0.5), χ is the co-latitude of the experiment from the north pole (∼ 38°), η is the angle between Earth's orbital and equatorial planes (∼23.4°) and $\beta_\oplus$, Earth's orbital velocity suppressed by the canonical value for the speed of light in vacuum (9.9E-5). These sensitivities arise from orientation and design of the experiment and the frame transformations required to express bounds in the sun-centred frame of choice. Frame transformations and determination of sensitivities is discussed at length in the literature.

Amplitude	Sensitivity	Numerical Weight
S_0	-	-
$SS^0_{\omega_\oplus}$	$4F_1 \sin(\chi)\tilde{\kappa}^{YZ}_{e-}$	1.1
$SS_{\omega_\oplus}C_{\Omega_\oplus}$	$-4F_2\beta_\oplus \sin(\chi)\left(\cos(\eta)\tilde{\kappa}^{XY}_{o+} - \sin(\eta)\tilde{\kappa}^{XZ}_{o+}\right)$	4.9E-5 $\tilde{\kappa}^{XZ}_{o+}$-1.1E-4 $\tilde{\kappa}^{XY}_{o+}$
$SS_{\omega_\oplus}C_{2\Omega_\oplus}$	$-F_1\beta^2_\oplus \sin(2\eta)\sin(\chi)\tilde{\kappa}_{tr}$	-2E-9
$SC^0_{\omega_\oplus}$	$-4F_1 \sin(\chi)\tilde{\kappa}^{XZ}_{e-}$	-1.1
$SC_{\omega_\oplus}S_{\Omega_\oplus}$	$4F_2\beta_\oplus \sin(\chi)\tilde{\kappa}^{XY}_{o+}$	1.2E-4
$SC_{\omega_\oplus}C_{\Omega_\oplus}$	$4F_2\beta_\oplus \sin(\eta)\sin(\chi)\tilde{\kappa}^{YZ}_{o+}$	4.8E-5
$SC_{\omega_\oplus}S_{2\Omega_\oplus}$	$2F_1\beta^2_\oplus \sin(\eta)\sin(\chi)\tilde{\kappa}_{tr}$	2.2E-9
$SS^0_{2\omega_\oplus}$	$-4F_1 \cos(\chi)\tilde{\kappa}^{XY}_{e-}$	-1.5
$SS_{2\omega_\oplus}S_{\Omega_\oplus}$	$-4F_2\beta_\oplus \cos(\chi)\tilde{\kappa}^{XZ}_{o+}$	-1.6E-4
$SS_{2\omega_\oplus}C_{\Omega_\oplus}$	$4F_2\beta_\oplus \cos(\eta)\cos(\chi)\tilde{\kappa}^{YZ}_{o+}$	1.5E-4
$SS_{2\omega_\oplus}S_{2\Omega_\oplus}$	$2F_1\beta^2_\oplus \cos(\eta)\cos(\chi)\tilde{\kappa}_{tr}$	6.6E-9
$SC^0_{2\omega_\oplus}$	$2F_1 \cos(\chi)\left(\tilde{\kappa}^{XX}_{e-} - \tilde{\kappa}^{YY}_{e-}\right)$	7.2E-1
$SC_{2\omega_\oplus}C_{\Omega_\oplus}$	$-4F_2\beta_\oplus \cos(\eta)\cos(\chi)\tilde{\kappa}^{XZ}_{o+}$	-1.5E-4
$SC_{2\omega_\oplus}S_{\Omega_\oplus}$	$-4F_2\beta_\oplus \cos(\chi)\tilde{\kappa}^{YZ}_{o+}$	-1.6E-4
$SC_{2\omega_\oplus}C_{2\Omega_\oplus}$	$0.5F_1\beta^2_\oplus (3+\cos(2\eta))\cos(\chi)\tilde{\kappa}_{tr}$	6.6E-9
C_0	$-3F_1 \sin(\chi)^2\tilde{\kappa}^{ZZ}_{e-}$	-5.1E-1
$CS^0_{\omega_\oplus}$	$4F_1 \sin(\chi)\tilde{\kappa}^{YZ}_{e-}$	8.8E-1
$CS_{\omega_\oplus}C_{\Omega_\oplus}$	$2F_2\beta_\oplus \sin(2\chi)\left(\sin(\eta)\tilde{\kappa}^{XZ}_{o+} - \cos(\eta)\tilde{\kappa}^{XY}_{o+}\right)$	3.9E-5 $\tilde{\kappa}^{XZ}_{o+}$-8.9E-5 $\tilde{\kappa}^{XY}_{o+}$
$CS_{\omega_\oplus}C_{2\Omega_\oplus}$	$2F_1\beta^2_\oplus \sin(\eta)\cos(\eta)\sin(\chi)\cos(\chi)\tilde{\kappa}_{tr}$	1.6E-9
$CC^0_{\omega_\oplus}$	$4F_1 \sin(\chi)\tilde{\kappa}^{XZ}_{e-}$	8.8E-1
$CC_{\omega_\oplus}S_{\Omega_\oplus}$	$2F_2\beta_\oplus \sin(2\chi)\tilde{\kappa}^{XY}_{o+}$	9.7E-5
$CC_{\omega_\oplus}C_{\Omega_\oplus}$	$-2F_2\beta_\oplus \sin(2\chi)\sin(\eta)\tilde{\kappa}^{YZ}_{o+}$	-3.8E-5
$CC_{\omega_\oplus}S_{2\Omega_\oplus}$	$-F_1\beta^2_\oplus \sin(\eta)\sin(2\chi)\tilde{\kappa}_{tr}$	-1.7E-9
$CS^0_{2\omega_\oplus}$	$-F_1(3+\cos(2\chi))\tilde{\kappa}^{XY}_{e-}$	-1.5
$CS_{2\omega_\oplus}C_{\Omega_\oplus}$	$F_2\beta_\oplus (3+\cos(2\chi))\cos(\eta)\tilde{\kappa}^{YZ}_{o+}$	1.5E-4
$CC^0_{2\omega_\oplus}$	$-0.5F_1(3+\cos(2\chi))\left(\tilde{\kappa}^{XX}_{e-} - \tilde{\kappa}^{YY}_{e-}\right)$	-7.4E-1
$CC_{2\omega_\oplus}C_{\Omega_\oplus}$	$F_2\beta_\oplus (3+\cos(2\chi))\cos(\eta)\tilde{\kappa}^{XZ}_{o+}$	1.5E-4
$CC_{2\omega_\oplus}S_{\Omega_\oplus}$	$-F_2\beta_\oplus (3+\cos(2\chi))\tilde{\kappa}^{YZ}_{o+}$	-1.6E-4
$CC_{2\omega_\oplus}C_{2\Omega_\oplus}$	$0.13F_1\beta^2_\oplus (3+\cos(2\eta))(3+\cos(2\chi))\tilde{\kappa}_{tr}$	6.8E-9

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