Erratum: Higher-order spin effects in the dynamics of compact binaries. II. Radiation field [Phys. Rev. D 74, 104034 (2006)]

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The orbital frequency evolution $\dot{\omega}$ and phase ϕ have been incorrectly computed. When using the balance equation (6.1) it was incorrectly assumed that the spin variables $\mathbf{S}$ and $\mathbf{\Sigma}$ (introduced in paper I [1]) are secularly constant, i.e. do not evolve by gravitational radiation reaction. [In addition the phase (7.13) has been deduced from (7.12) in a way inconsistent with the latter assumption.] However the spin variables that are secularly constants (to the considered order) have been proved [2] to be specifically the ones associated with the constant magnitude spins, namely $\mathbf{S}^{\rm c}$ and $\mathbf{\Sigma}^{\rm c}$ introduced and discussed in Sec. VII. Therefore the balance equation (6.1) [in the form of (6.13)] should be applied with the energy E and flux $\mathcal{F}$ expressed in terms of the constant-magnitude spins $S^{\rm c}_\ell$ and $\Sigma^{\rm c}_\ell$. The required E and $\mathcal{F}$ are given by (7.9) and (7.11). As a result we find the frequency evolution

$$\frac{\dot{\omega}}{\omega^2} = \frac{96}{5}\nu x^{5/2}\bigg\{1 + x\left(-\frac{743}{336} - \frac{11}{4}\nu\right) + 4\pi x^{3/2} + x^2\left(\frac{34\,103}{18\,144} + \frac{13\,661}{2016}\nu + \frac{59}{18}\nu^2\right) + \pi x^{5/2}\left(-\frac{4159}{672} - \frac{189}{8}\nu\right) + \frac{x^{3/2}}{Gm^2}\left[-\frac{47}{3}S^{\rm c}_\ell - \frac{25}{4}\frac{\delta m}{m}\Sigma^{\rm c}_\ell\right] + \frac{x^{5/2}}{Gm^2}\left[\left(-\frac{31\,811}{1008} + \frac{5039}{84}\nu\right)S^{\rm c}_\ell + \left(-\frac{473}{84} + \frac{1231}{56}\nu\right)\frac{\delta m}{m}\Sigma^{\rm c}_\ell\right]\bigg\}, \tag{1}$$

and orbital phase

$$\phi = \phi_0 - \frac{1}{32\nu}\bigg\{x^{-5/2} + x^{-3/2}\left(\frac{3715}{1008} + \frac{55}{12}\nu\right) + \frac{x^{-1}}{Gm^2}\left(\frac{235}{6}S^{\rm c}_\ell + \frac{125}{8}\frac{\delta m}{m}\Sigma^{\rm c}_\ell\right) - 10\pi x^{-1} + x^{-1/2}\left(\frac{15\,293\,365}{1\,016\,064} + \frac{27\,145}{1008}\nu + \frac{3085}{144}\nu^2\right) + \pi\ln x\left(\frac{38\,645}{1344} - \frac{65}{16}\nu\right) + \frac{\ln x}{Gm^2}\left[\left(-\frac{508\,265}{2016} - \frac{3665}{56}\nu\right)S^{\rm c}_\ell + \left(-\frac{37\,265}{448} - \frac{1735}{56}\nu\right)\frac{\delta m}{m}\Sigma^{\rm c}_\ell\right]\bigg\}. \tag{2}$$

In terms of the dimensionless single-spin variables, the spin-dependent part of the above equation reads

$$\phi_{\rm S} = -\frac{1}{32\nu}\sum_{i=1,2}\chi^{\rm c}_i\kappa^{\rm c}_i\bigg\{\left(\frac{565}{24}\frac{m_i^2}{m^2} + \frac{125}{8}\nu\right)x^{-1} + \left[\left(-\frac{681\,145}{4032} - \frac{965}{28}\nu\right)\frac{m_i^2}{m^2} + \left(-\frac{37\,265}{448} - \frac{1735}{56}\nu\right)\nu\right]\ln x\bigg\}. \tag{3}$$

These equations replace Eqs. (6.14)-(6.15)-(6.16) and (7.12)-(7.13)-(7.14) in the paper. The new results for the accumulated number of GW cycles in Tables II and III are given below. The two last paragraphs of Sec. VII ("As seen in Sec. VI [...] used for the measurement.") should be removed. No other results in the paper are modified. We are grateful to Achamveedu Gopakumar and Gerhard Schäfer for pointing out this error in our paper. We note also that in paper I Eqs. (2.17) should be replaced by

$$S^{0i}_A = -\frac{1}{\sqrt{-g_A}}\varepsilon^{ijk}u^A_j S^A_k, \tag{4a}$$

$$S^{ij}_A = -\frac{1}{\sqrt{-g_A}}\varepsilon^{ijk}\left[u^A_0 S^A_k + u^A_k\frac{v^l_A}{c}S^A_l\right]. \tag{4b}$$

	$(10 + 1.4)M_\odot$	$(10 + 10)M_\odot$	$(1.4 + 1.4)M_\odot$
Newtonian	3577	601	16034
1PN	+213	+59.3	+441
1.5PN	$-181 + 114\kappa^{\rm c}_1\chi^{\rm c}_1 + 11.8\kappa^{\rm c}_2\chi^{\rm c}_2$	$-51.4 + 16.0\kappa^{\rm c}_1\chi^{\rm c}_1 + 16.0\kappa^{\rm c}_2\chi^{\rm c}_2$	$-211 + 65.7\kappa^{\rm c}_1\chi^{\rm c}_1 + 65.7\kappa^{\rm c}_2\chi^{\rm c}_2$
2PN	$+9.8 - 4.4\kappa^{\rm c}_1\kappa^{\rm c}_2\chi^{\rm c}_1\chi^{\rm c}_2 + 1.5\xi^{\rm c}\chi^{\rm c}_1\chi^{\rm c}_2$	$+4.1 - 3.3\kappa^{\rm c}_1\kappa^{\rm c}_2\chi^{\rm c}_1\chi^{\rm c}_2 + 1.1\xi^{\rm c}\chi^{\rm c}_1\chi^{\rm c}_2$	$+9.9 - 8.0\kappa^{\rm c}_1\kappa^{\rm c}_2\chi^{\rm c}_1\chi^{\rm c}_2 + 2.8\xi^{\rm c}\chi^{\rm c}_1\chi^{\rm c}_2$
2.5PN	$-20 + 32.0\kappa^{\rm c}_1\chi^{\rm c}_1 + 2.7\kappa^{\rm c}_2\chi^{\rm c}_2$	$-7.1 + 5.5\kappa^{\rm c}_1\chi^{\rm c}_1 + 5.5\kappa^{\rm c}_2\chi^{\rm c}_2$	$-11.7 + 9.0\kappa^{\rm c}_1\chi^{\rm c}_1 + 9.0\kappa^{\rm c}_2\chi^{\rm c}_2$
3PN	+2.3	+2.2	+2.6
3.5PN		−0.8 −1.8	−0.9

	$(10^6 + 10^6)M_\odot$	$(10^6 + 10^5)M_\odot$	$(10^5 + 10^5)M_\odot$
Newtonian	2267	4985	9570
1PN	$+134$	$+281$	$+323$
1.5PN	$-92.4 + 28.8\kappa_1^c\chi_1^c + 28.8\kappa_2^c\chi_2^c$	$-243 + 161\kappa_1^c\chi_1^c + 11.5\kappa_2^c\chi_2^c$	$-170 + 53\kappa_1^c\chi_1^c + 53\kappa_2^c\chi_2^c$
2PN	$+6.0 - 4.8\kappa_1^c\kappa_2^c\chi_1^c\chi_2^c + 1.7\xi^c\chi_1^c\chi_2^c$	$+12.5 - 4.4\kappa_1^c\kappa_2^c\chi_1^c\chi_2^c + 1.5\xi^c\chi_1^c\chi_2^c$	$+8.7 - 7.1\kappa_1^c\kappa_2^c\chi_1^c\chi_2^c + 2.4\xi^c\chi_1^c\chi_2^c$
2.5PN	$-9.0 + 6.9\kappa_1^c\chi_1^c + 6.9\kappa_2^c\chi_2^c$	$-26.5 + 44.2\kappa_1^c\chi_1^c + 2.5\kappa_2^c\chi_2^c$	$-11.0 + 8.5\kappa_1^c\chi_1^c + 8.5\kappa_2^c\chi_2^c$
3PN	$+2.3$	$+2.3$	$+2.5$
3.5PN	-0.9	-2.3	-0.9

[1] G. Faye, L. Blanchet, and A. Buonanno, Phys. Rev. D **74**, 104033 (2006).
[2] C. Will, Phys. Rev. D **71**, 084027 (2005).