Erratum: Semirelativistic approximation to gravitational radiation from encounters with nonspinning black holes [Phys. Rev. D 72, 084009 (2005)]

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(Dated: December 10, 2011)

PACS numbers: 04.30.Db, 99.10.Cd

There are a number of errors in the formula given for changes in energy and angular momentum in Sec. III D and Appendix A I. These have no further consequences.

In equation (35) the function multiplying the elliptic integral $\mathbf{K}$ should be $f_2(r_p/M)$ not $f_1(r_p/M)$. The second polynomial defined for (37) should be

$$\begin{aligned} g_2(y) = 71285760 - 324389184y + 468548880y^2 - 277856496y^3 + 54521424y^4 \\ +6181872y^5 - 1630457y^6 - 238086y^7 - 31776y^8 - 4120y^9, \end{aligned} \tag{1}$$

with a positive coefficient for y^2. The polynomial defined for equation (A3) contains several sign errors, it should be

$$\begin{aligned} f_1(y,e) = {} & 4608(1-e)(1+e)^2\left(3+e^2\right)^2\left(2428691599 + 313957879e^2 + 1279504693e^4\right. \\ & \left. + 63843717e^6\right) - 192(1+e)^2\left(908960573673 - 155717471796e^2\right. \\ & \left. - 88736969547e^4 - 293676299040e^6 - 195313674237e^8 - 26635698156e^{10}\right. \\ & \left. - 346799201e^{12}\right) y + 384(1+e)^3\left(336063804453 - 53956775638e^2 - 33318942522e^4\right. \\ & \left. - 92857670352e^6 - 41764459155e^8 - 2765710514e^{10}\right) y^2 \\ & - 16(1+e)^4\left(3418907055555 - 580720618635e^2 - 168432860626e^4\right. \\ & \left. - 606890963686e^6 - 176495184865e^8 - 3768291999e^{10}\right) y^3 \\ & + 32(1+e)^5\left(510454645597 - 92175635794e^2 + 26432814256e^4 - 28250211070e^6\right. \\ & \left. - 5713846269e^8\right) y^4 - 4(1+e)^6\left(1107402703901 - 174239346926e^2\right. \\ & \left. + 100957560852e^4 + 3707280110e^6 - 899162673e^8\right) y^5 \\ & + 8(1+e)^7\left(143625217397 - 16032820010e^2 + 4238287541e^4 + 275190560e^6\right) y^6 \\ & - (1+e)^8\left(220627324753 - 14884378223e^2 - 1210713997e^4 + 14138955e^6\right) y^7 \\ & + 8(1+e)^9\left(2922108518 - 46504603e^2 - 2407656e^4\right) y^8 \\ & - 3(1+e)^{10}\left(241579935 + 6314675e^2 - 149426e^4\right) y^9 \\ & - 4(1+e)^{11}\left(8608805 - 48992e^2\right) y^{10} - 2(1+e)^{12}\left(1242083 - 16320e^2\right) y^{11} \\ & - 184320(1+e)^{13}y^{12} - 5120(1+e)^{14}y^{13}\,. \end{aligned} \tag{2}$$

The Taylor expansion in (A5) for the change in energy should have $192\pi/5$ as the numerical prefactor for the $(r_p/M)^{-9/2}$ term and not $64\pi/5$.

Additionally, there are additional typographical mistakes. Equation (40) should read

$$\frac{M}{m}\Delta X \approx p_X \ln\left(\frac{r_p}{M} - 4\right) + q_X + O\left(\frac{r_p}{M} - 4\right), \tag{3}$$

and equation (43)

$$\frac{M}{m}\Delta X = \sum_{n=0}^{N_x} -A_n^X \ln\left(\frac{r_p}{M} - 4\right) + A_n^X \ln(2B_n^X) + O\left(\frac{r_p}{M} - 4\right). \tag{4}$$

Equation (A4) should read

$$\frac{\Delta L}{m} = -\frac{16M^{15/2}}{24249225(1+e)^{13/2}r_p^{7/2}\left(r_p-2M\right)^2\left[(1+e)\,r_p-2\,(1-e)\,M\right]^2}$$
$$\times\left[\sqrt{(1+e)\frac{r_p}{M}-2(3-e)}\mathbf{E}\left(\sqrt{\frac{4eM}{(1+e)r_p-2(3-e)M}}\right)g_1\left(\frac{r_p}{M},e\right)\right.$$
$$\left.+\frac{1+e}{\sqrt{(1+e)\frac{r_p}{M}-2(3-e)}}\mathbf{K}\left(\sqrt{\frac{4eM}{(1+e)r_p-2(3-e)M}}\right)g_2\left(\frac{r_p}{M},e\right)\right], \tag{5}$$

the M in the argument of $\mathbf{K}$ was previously omitted.