Erratum: Ring-shaped luminescence patterns in a locally photoexcited electron-hole bilayer [Phys. Rev. B 81, 193403 (2010)]

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We have found a typo in the Y-projection of the interlayer electron-hole force in the MD code for 2D case. It affects the results shown in Fig. 3 and Fig. 4 of our original paper. Due to the typo the angular symmetry of carrier spatial distributions was broken that led to the absence of balance between pumping and decay in the 2D case without boundary and, eventually, to the permanent growth of the total number N of carriers in time t [inset in Fig. 3(a)].

Simulations by the revised code have shown that there is a saturation of $N(t)$ in the 2D case without boundary (see inset in Fig. 1 here). The balance occurs at about 350 particles that corresponds to the first plateau of $N(t)$ shown on the inset in Fig. 3(a). The spatial distributions of carriers and luminescence are quite similar to that shown in Fig. 3(b), i.e., there is clear spatial separation of the electron and hole distributions though the luminescence ring is less pronounced (main panel in Fig. 1 here).

The dependence of the ring position on the pumping rate p (Ref. 1) becomes very weak: the increase of p in few times leads to the growth of the ring radius on few percents (Ref. 2). In this relation, the results shown in Fig. 4 are erroneous. Note that at $p=10$ for the 2D case without boundary the maximal radius of the electron distribution is about 100 so the boundary $r_b=100$ plays no role.

So, the main consequence of the revised code is the saturation in the 2D case without boundary. Note that it brings an exciting opportunity to perform non-time-consuming molecular-dynamic simulations of spatiotemporal dynamics of charge carriers in mesoscopic 2D systems.

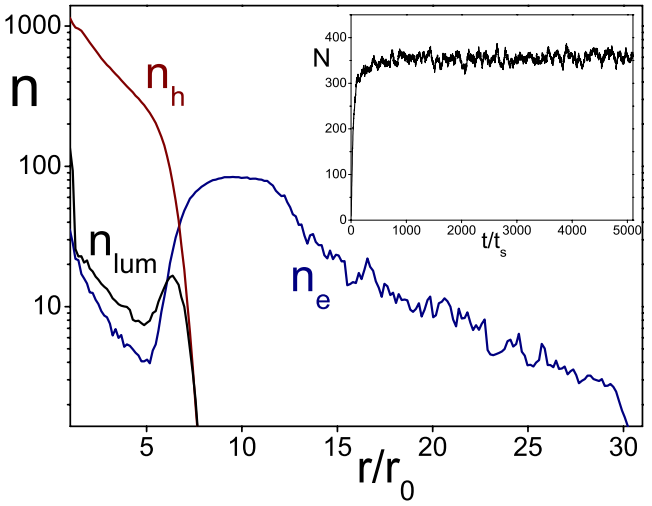

FIG. 1. (Color online) Stationary spatial distributions of electrons (n_e), holes (n_h), and luminescence (n_{lum}) averaged over time window (500, 5000) in the 2D case without boundary. Inset: dependence $N(t)$. All parameters are the same as for Fig. 3.

[1] During MD simulation the time is changed by discrete steps, with the elementary time step Δt. The rate p was defined as a probability per unit time to create *one* e-h pair in the excitation spot, so that $p\Delta t<1$. One can refer to this case as single generation regime.

[2] It might result from the pumping algorithm used (Ref. 1) providing effectively too small pumping rate to apply the qualitative picture described in Sec. V.

