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Dear Editor,

Submission of manuscript: "A generalized model for the charge transport properties of dressed quantum Hall systems"

Please find enclosed, a manuscript titled: "A generalized model for the charge transport properties of dressed quantum Hall systems" which we are submitting for exclusive consideration of publication as an article in your highly esteemed journal, Physical Review B.

This manuscript presents a generalized mathematical model for predicting the transport properties of a quantum system exposed to a stationary magnetic field and a high-intensity electromagnetic field. We can observe the quantum Hall effect in two-dimensional (2D) fermion systems at low temperatures under the strong stationary magnetic fields. In addition, we can observe more exciting phenomena by simultaneously applying a dressing field to a quantum Hall system already under a non-oscillating magnetic field. We treat the interacting fermion system and the radiation as one combined quantum system, namely dressed system.

Previous studies have demonstrated several models for the one-directional conductivity behavior of dressed quantum Hall systems. However, they have not adopted the state-of-the-art model to describe the conductivity in a quantum Hall system. In this work, we introduce a new formulation, which is based on Landau quantization theory and the Floquet-Drude conductivity approach. We explicitly calculate the longitudinal components of the conductivity tensor in a periodically driven quantum Hall system. Finally, we demonstrate that our generalized model reproduces the results of the state-of-the-art conductivity model, which was developed for the more specific case of quantum Hall systems without the external dressing field. Moreover, we find that the optical field can be used as a mechanism to regulate transport behavior in numerous 2D nanostructures which can serve as a basis for many useful nanoelectronic devices.

We believe that Physical Review B, with its reach towards readers working in both pure and applied physics, is the optimal platform to present our work, leading to a fruitful and open discussion of the consequences of our results.

Therefore, we herewith submit our manuscript to Physical Review B for your kind consideration. We appreciate your valuable time and anticipate a favorable outcome.

Yours sincerely,

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