

RESPONSE TO REFREE COMMENTS

Manuscript ID: coatings-1650993

Title: *"Spin-current oscillations in diluted magnetic semiconductor multibarrier GaMnAs/GaAs: Role of temperature and bias voltage".*

Dear Editor,

Thank you very much for your interest in our paper with No: **coatings-1650993** entitled as "*Spin-current oscillations in diluted magnetic semiconductor multibarrier GaMnAs/GaAs: Role of temperature and bias voltage*". Moreover, we also would like to thank to the reviewers for their thoughtful review and useful comments/suggestions on the structure of our revised manuscript. We feel the guidance provided by them has helped us to better focus on our goals and improve the general framework of the paper. We specifically address each of the reviewer concerns appended below. The revised manuscript has been resubmitted to the journal. We appreciate your careful evaluation of our work and hope that our response meets with your approval and look forward to your positive response.

Sincerely yours,

Reviewer #3 comments Comments and Suggestions for Authors Al-Samehri and Dakhlaoui applied the transfer matrix method to study the coherent spin dependent transport of holes across multilayer structures of GaAs or $\text{Ga}_{(x)}\text{Mn}_{(1-x)}\text{As}$ layers. I do like that the results are presented in concrete units, but they did not include at all the actually used potentials they used for the different sections GaAs or $\text{Ga}_{(x)}\text{Mn}_{(1-x)}\text{As}$. I can only assume that they always used the same $V(x)$ in Eqn. (1) for the same	We thank the reviewer for these valuable remarks. The spin-dependent potential was taken from fig 4 in reference [23]. According to reference [23] this potential depends on the temperature of the system and the spin orientation of holes. In fact, when the holes considered have spin-up orientation, the magnetic layers sandwiched between GaAs layers act as quantum wells and when the holes considered have spin-down orientation, the magnetic layers act as barriers. For simplicity we have assumed that the spin dependent potential dose not make a large change when multiple layers are considered. Similarly, we only considered the scattering of
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combination of spin and layer type and gate voltage. The different potentials should be explicitly included in section 2. This oversight renders their findings in fact un-reproducible. In particular it would be completely impossible for experimentators to check if the potentials could be tuned to match observations better. The geometry (in plane or out of plane) of the ferromagnetic $\text{Ga}(x)\text{Mn}(1-x)\text{As}$ layers and its relation to spin up and spin down should be included in the introduction. The effects of incoherent scattering on the calculated transmissions should at least be discussed with an estimate. If such devices should ever be fabricated and spin transport is measured, incoherent scattering will have to be considered. The article is well written and should be easily accessible to a wider audience, I just spotted a few minor spelling issues: line 91 "we can be linked" -> "we can link" line 107 please verify the order of the product line 268 "is occured" -> "occurs" line 275 "to close the" -> "to"	the carriers by the electrostatic part of the Mn's impurity potential. This potential is higher than the interaction between holes (see reference Phys. Rev. B 64 (2001) 140403. In our future work we plan to solve the Schrödinger equation with the Poisson equation self consistently to discuss the hole-hole interaction and to compare it to the hole-magnetic ions interaction. By a self-consistent resolution, we can conclude about the validity and limits of the present model. According to the reviewer remarks, we have corrected in the revision version the minor spelling issues: 1) we can be linked" -> becomes "we can link" 2) is occured" -> becomes "occurs. 3) to close the" -> becomes "to" 4) the unity" -> becomes "unity" <u>All the corrected terms in the revised version are written with blue color.</u>
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line 278&279 "the unity" -> "unity"	
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