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| Q1. Is the motivation for the choice of the scientific field well described? |
| Q2. Are the medium-term career objectives clearly defined? |
| Q3. Is the desired impact of the fellowship on the applicant's scientific career clearly stated? |

# I will torture you a bit with the cover letter from the English point of view and the logic

# Cover letter

Since the assumption based on theory is that (is the first part of the sentence grammatically correct?) (article) quantum computer can outperform (in what?) the classical one by many orders of magnitude for the (is the correct here?) specific classes of algorithms, I am very happy to be a part of the research community, trying to develop the basic unit and coupling mechanisms for the basic unit of such a computer, called qubit. (is the computer called qubit?)

Coherence vs manipulation time ratio is the main qubit parameter that needs to be boosted. There are several different approaches to a qubit realization. (article) Approach in our group is based on (article) hole spin in semiconductor material called silicon germanium. Because of low hyperfine interaction and high spin-orbit coupling for heavy holes in germanium, coherence vs manipulation time ratio should be high, according to the (are they concrete?) theoretical proposals.

Another big barrier for realizing (article) quantum computer is scalability – (article) qubit number need to be scaled up to the array of a large number of qubits for performing a quantum algorithms. Nanofabrication compatibility of a (why do you use here an article?) silicon germanium with the CMOS industry (is the nanofabrication compatible with industry or processes used in industry?) helps to lift this barrier. Using already predefined gates for sensing a state of a qubit lifts the second barrier towards scalability solving the state readout in (article) non-invasive way which is not the case for the conventional charge sensor readout technique. Previously listed advantages of the spin qubit realization approach used in our scientific group, makes me motivated to pursue the goal to prove these theoretical predictions also experimentally.

Working on the gate reflectometry as a spin qubit readout system will involve gaining knowledge in high frequency signal components (amplifiers, filters, attenuators, coaxial cables), high frequency circuit design and possibly COMSOL simulations. Current trend of scaling up qubits puts a big emphasis on the “scale-up friendly” readout system of individual qubits. With a (is this the correct article?) knowledge gained from (article) design of the gate reflectometry readout system I hope I can be a good candidate to continue my work in this emerging area of quantum computation.

If the gate reflectometry proves to be very sensitive as we expect, this would enable our group and me to move towards performing experiments to determine the characteristic spin lifetimes of the silicon germanium nanowire based double quantum dot qubit. We hope to achieve high values for qubit quality criteria in respect to the other proposed spin qubits. Namely, those criteria are the spin relaxation time T1, the spin dephasing time T2\*, the spin echo T2ECHO  time and the CPMG T2CPMG time.

Here is there is a big logic gap. There is no connection of the last paragraph to the previous part.

Since February I am the (is an article needed? If yes which?) PhD student at Institute of Science and Technology (IST) in Austria. It is very international institution with very high and ambitious goals and it makes me happy to be a part of it. Senior scientists here are very good which helps me in a development of the scientific skills and knowledge by learning from them. It is also very well equipped which provides me, as well as the other scientific groups, all the necessary equipment for doing a (is an article needed? If yes which?) top class research.

What is missing is why are you doing a PhD? What do you want to do after your PhD? And why is it important for you getting this fellowship?

So in my view the structure should be

1. What fascinates me about the field? Why does my profile fit well with this field? Why do I think IST Austria is a good place to do my PhD?
2. What do I want to do after my Phd?
3. Why will this fellowship help me in realizing b?