

Prof. Branislav K. Nikolić
Email: bnikolic@udel.edu
WWW: <https://wiki.physics.udel.edu/qttg>

RE: Support Letter for KWANT project

To whom in may concern:

I am writing this Letter to offer my *most enthusiastic support* for funding of future developments in the KWANT project (<http://kwant-project.org/>). I am currently Full Professor of Physics at the University of Delaware in the US and a Senior Visiting Scientist at RIKEN Center for Emergent Matter Science in Japan. Since 2014, I have been using KWANT package extensively for both research on quantum transport in variety of nanostructures and in teaching of advanced graduate courses on Nanophysics.

As regards research, a decade ago my graduate students would spend many months to write Fortran codes or Matlab scripts capable of computing spin and charge currents in nanostructures composed of large number of atoms and attached to more than two electrodes. The solution to this well-known problem, which is implemented in KWANT and made public through open source software and excellent hands-on training sessions offered by KWANT developers around the world, is superior to both our old approaches and codes from other groups around the world that I am aware of. This is why my group has shifted to using KWANT or adding new functionalities into it (such as for spin current computation), which is made easy by its open source concept and usage of Python programming language. For example, our recent <http://arxiv.org/abs/1603.03870> demonstrates how KWANT can handle transport in graphene nanostructures composed of several million of carbon atoms, which makes it possible to directly model geometry and size of nanostructures employed by leading experimental groups.

As regards education, my course Introduction to Nanophysics (<https://wiki.physics.udel.edu/phys824>) includes one hour of Computer Lab per week where KWANT is one of the major software packages employed to train students for careers in nanoscience and nanotechnology. I have noticed that even students with insufficient background in quantum mechanics (e.g., such as the ones from engineering departments), who would have difficult time to solve homework and Project assignments in my course by writing their own Matlab scripts, can quickly learn how to communicate with KWANT by writing short Python scripts and perform highly nontrivial modeling calculations.

In conclusion, due to its unique capabilities, advanced algorithms implemented, excellent support through Website and training sessions, future funding for KWANT should be priority for any agency interested to support open source software for basic research in nanoscience and applications in nanotechnology.

Best regards,



Branislav K. Nikolić