UNIVERSITY OF MINNESOTA

Twin Cities Campus

William I. Fine Theoretical Physics Institute
School of Physics and Astronomy
College of Science and Engineering

Tate Laboratory of Physics
116 Church Street S.E.
Minneapolis, MN 55455
Office: 612-624-7366
www.ftpi.umn.edu
Email: ftpi@physics.umn.edu

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Dear Jane-Ling Wang,

I strongly recommend Dr. Tao Hu for a tenure-track faculty position in your Department. Tao is one of three best students I have ever had in my 35 years professor carrier. He was first in my class of Statistical Physics and in all the other graduate courses he took. In our first interaction in my office Tao impressed me by his understanding of physics and showed that he never compromises in search for scientific truth. I immediately agreed to become his advisor.

I have suggested to Tao a difficult project on the border of physics, chemistry, biology and nano-science. In the first two papers we studied the time it takes for a protein molecule to find a target site on coiled or globular bacterial DNA, alternating random walks in water and sliding in random direction along DNA. Previously only the case of geometrically straight DNA was studied, but we wanted to extend this theory to a globular DNA geometry. This is an important problem for under-standing of how genes are regulated. We learned recently that we have almost the same number of genes as a fly, but we regulate our genes better. This is why gene regulation is so important.

The beauty of physics is that if you have solved one problem, you can be sure you have already solved a few others. Soon, Tao realized that our solution is applicable to the problem of virus self-assembly from proteins. A simple virus consists of a protein shell (capsid) with a single stranded RNA molecule packed inside. Capsid protein molecules self-assemble because RNA is negative and capsid proteins are positive and stick to RNA. Self-assembly starts, say, from one end of RNA. Concentration of proteins typically is very small and it is difficult for them to find the assembly spot. Tao figured out that here again sliding on RNA helps. One can say that if proteins are compared with fish in a lake, the RNA molecule tail facilitates assembly and plays the role of a fishing rod. While I was skeptical he calculated acceleration of self-assembly by this rod. Understanding how self-assembly works can eventually teach us how to fight viruses.

At the same time we also realized that mathematical methods we developed for the target search let us also address the electric transport in nano-composites made of long nano-wires (carbon nano-tubes or conducting polymers) deposited on an insulating substrate or suspended in a weakly conducting media. Such composites are used to make gas sensors, because nano-wires have a large contact area to adsorb gas molecules.

In his PhD work Tao demonstrated all the components of a great scientist. He has great knowledge of physics, mathematics and biology, and constantly moves ahead studying new areas. He clearly sees any physical phenomenon beyond formalism and has a great intuition. He is a deep and original thinker. It is he who suggested the application of our theory to self-assembly viruses. This is also a good example of his leadership in our work.

Tao is a good speaker and, therefore, will be able to teach well. On a personal level, Tao is the most pleasant, intelligent, devoted to science and well organized coworker one can only dream about.

After graduation Tao moved to neuroscience, where he found more challenging problems than in physics. As far as I hear from his adviser, he has a great success. I am, however, not able to describe his work after PhD. I give Tao Hu my strongest possible recommendation for a tenure-track position.

Boris Shklovskii,

A.S. Fine Professor of Physics,

Department of Physics,

University of Minnesota.