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December 21, 2004

Dear Sir or Madam;

I am writing this letter of support for Dr. Lizhi Ouyang, who is applying for an Assistant professor position in your department. I am very pleased to be able to comment on Dr. Ouyang and I highly recommend him for the position.

Please let me introduce myself briefly in order to put this letter in perspective. I am a Physics Professor at the University of Saskatchewan in Saskatoon, Canada. During my ten-year career I have contributed more than 90 publications in internationally read peer-reviewed journals. In 2002, I have been awarded a prestigious Canada Research Chair. I am a member of the User Executive committee (UEC) at the Advanced Light Source at Berkeley National Laboratory where I also carry out most of my experiments. My research concerns the electronic structure of new materials such as metallic DNA and ultra-hard materials such as spinel Si_3N_4 . Although I am an experimentalist, I consider myself quite capable of a critical analysis of Dr. Ouyang's previous work.

Through the past 3 years I have been collaborating with the research group of Prof. Ching at the University of Missouri – Kansas City. As you know Dr. Ouyang is a member of Dr. Ching's group and it is through this connection that I became familiar with Dr. Ouyang's quality research. Dr. Ouyang's successfully and substantially improved the computational density functional methods used by Dr. Ching's group. The newly modified methodology allows for detailed analysis of important biosystems previously beyond the reach of many interested groups. This work has shown that complicated biosystems at the center of countless healthcare issues can now be studied in exceptional detail.

The collaboration started with Dr. Ouyang on a study of the family of cobalamines. Cyanocobalamin, commonly called Vitamin B12, is a biomolecule of great importance and Dr. Ouyang has provided important insight to the nature of Vitamin B12, its bonding and electronic properties. My role in the study was to carry out the measurements, which I then compared with the calculations performed by Dr. Ouyang. His calculations were to my knowledge the first DFT to B12, which included all constituents of B12.

We are currently working on double strand DNA (B-DNA) and metallic DNA as well as Ferrocene-labeled peptides. There is an active discussion in the literature whether B-DNA is insulating, super- or semiconducting. We recently measured band gaps for various B-DNA systems. Dr. Ouyang has calculated the electronic structure of an isolated infinite long dry B-DNA in a periodic setup. We estimated a $\sim 2\text{eV}$ gap in the DNA backbone. His model and our measurements will allow us to explain the discrepancies

among the current experiments in the literature.

Dr. Ouyang also calculated the electronic structure of Ferrocene peptides using OLCAO. We used calculated PDOS of C, O, N and Fe to interpret our XAS and XES spectra and in particular to understand the impact of the peptides chain on the single Fe atom.

The point I would like to make is that Dr. Ouyang quickly adapts to new systems and he does so independently and in great depth. This is also the main reason why he has become of such importance to the group of Prof. Ching. He in fact oversees to my knowledge all projects.

Dr. Ouyang is a pleasure to interact with and he leads students in a calm but assertive way always leading by example.

It is not only because of this recent work, but also because of the great potential of Dr. Ouyang's future work that I strongly support his application to your department. The depth of knowledge and level of application Dr. Ouyang has shown is excellent. In his approach to B-DNA he quickly improved existing models and in fact quickly found new problems underlying some of the established approaches. His dedication to research and the cleverness of his approaches clearly place him among the most talented and hardest working scientists. Dr. Ouyang's field of research will surely have a profound impact on advancements in biotechnology and in modern materials research. First principles calculations of biomolecules such as Vitamin B12 can provide the necessary insight to solve some of the complex health challenges facing us all today and in the future.

I do recommend him very strongly and I think that his skills will be an extremely valuable asset to any research-oriented department with interest in studying the electronic structure of novel materials.

Please feel free to contact me if I can be of further assistance.

Sincerely,



[Alexander Moewes]

Professor

Canada Research Chair for Materials Science with Synchrotron radiation