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To whom it may concern

Salvador, 10th of June 2015.

Mr. José Luis Lima de Jesus Silva, student of the Post-Graduation Program in Physics at the Federal University of Bahia (UFBA - Brazil) desires to apply his candidature as PhD student in Physics regarding first-principles studies of energy materials at the Uppsala University.

I am Associate Professor of the Institute of Physics of UFBA and I lead a research group (GEDES) studying thin films of semiconductors and oxides for the development of photovoltaic cells for solar energy conversion. In these last ten years, we were able to set up a laboratory for the manufacture of thin films by spray pyrolysis, electrodeposition, sol-gel and sputtering methods. Six physicists and two chemists are forming our group and advising a tenth of students of our post-graduation program. Furthermore, we realize theoretical calculations of crystal electronic structures using standard package such as VASP, WIEN2k, ABINIT or Exciting. We have some collaboration with Brazilian laboratories such as CETENE (North-East Technological Centre), and foreign laboratories such as Institut de Physique de Rennes and Department of Physics and Astronomy of the Uppsala University. Our collaboration with Doctor Giovanna Machado of CETENE on the photo-dissociation of water has motivated the research work of José Luis.

As his research advisor, I would like to point out the excellent work José Luis developed during his Master in Physics. He learned in a very detailed manner how to use the density functional theory (DFT) in order to determine the adsorption of photo-catalysers at TiO<sub>2</sub> (110) Rutile surface. During this work, he studied some methods to get essential properties of this photo-catalytic system aimed at the photo-dissociation of water to produce Hydrogen. He successfully defended his Master Dissertation on the 13<sup>th</sup> of April.

José Luis demonstrated to have very good qualities such as skill for computational works, tenacity for solving difficult problems, intellectual rigour in the mathematical developments, and motivation for the study of material structures. For these reasons, I enthusiastically recommend Mr. José Luis Lima de Jesus Silva as an outstanding student who has potential to undertake doctoral studies at the Uppsala University and to make, in the future, very good contributions to our laboratory in Brazil.

Sincerely yours,

Denis G. F. David  
Associate Professor  
Institute of Physics (UFBA)