University of Notre Dame
Strategic Academic Planning Committee
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PROPOSAL COVER SHEET

Proposal Type: Full Grant _____ Seed Grant X

Proposal Title: A Focused Interdisciplinary Research Group in Nanostructured Solar Cells

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Participants:

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A Focused Interdisciplinary Research Group in Nanostructured Solar Cells coupled with the creation of a Startup Company in Innovation Park

A. Abstract

One of the biggest challenges facing mankind is to meet the future energy needs of the planet. Currently 85% of our energy is supplied by fossil fuels. However, in the next 25 years the world's energy requirements will double, and it is clear in terms of production, politics and environmental impact that fossil fuels cannot meet this increased demand. Any environmentally sustainable solution will need a significant contribution from renewable energy sources, such as solar energy, wind, tides/ocean currents, and/or hydroelectricity. Of these different options, solar energy is by far the most promising, as the amount of solar energy hitting the earth every day greatly exceeds the amount of energy available from other renewable sources. This project describes a plan to develop the fundamental, transformative science underlying the next generation of nanostructured solar cells. The approach is based on a synergistic combination of materials synthesis, ultrafast optical studies and device development. The goal is to produce semiconductor nanowire solar cells where the photocurrent is amplified by multiple exciton generation. We also propose to commercialize thin film photovoltaics based on existing semiconductor quantum dot nanocomposites. These devices could have a significant beneficial impact on society, providing a cheap source of electricity for developing nations.