INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	**Ph.D.**
Thesis Title	:	**Design And Fabrication Of Solid State TiO_2|Ag Structure For Developing Efficient Plasmonic Photo-Electric Conversion Device**
Name of Thesis Supervisor(s)	:	**(Late)Dr.Harsh Chaturvedi and Prof. Pranab Goswami**
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The global shift towards renewable energy sources, propelled by environmental concerns, has ignited a surge in research aimed at developing efficient solar energy technologies. This thesis is dedicated to the creation of a solid-state plasmonic energy harvesting device using low cost methodologies. Initial simulations compare various noble metal nanoparticles for their plasmonic resonance properties, with silver identified as particularly advantageous due to its sensitivity and electronic characteristics. Semiconductor substrates are synthesized through a simplified Sol-Gel technique, resulting in the production of TiO_2 thin films tailored for solar applications. Subsequently, a solid-state energy harvesting device is fabricated, leveraging metal/semiconductor heterojunctions to achieve promising cell performances. Furthermore, the thesis delves into an environmentally friendly approach to synthesizing silver-graphene nanocomposites, which holds significant potential for enhancing device efficiency. These findings represent a significant stride forward in the design and implementation of efficient plasmonic energy harvesting devices, paving the way for sustainable advancements in solar power generation.