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ECE Ph.D. student Sagnik Dasgupta wins Best Poster Award at the IEEE Photovoltaics Conference for his innovative research on manufacturing high-efficiency silicon solar cells using laser oxidation, offering a scalable and cost-effective solution with the potential to make solar electricity two to three times cheaper than fossil fuels, contributing to a more sustainable future.

The breakthrough approach described in Dasgupta"s research holds great promise for the solar energy industry. By reducing costs and increasing efficiency, this technique has the potential to make solar electricity two to three times cheaper than fossil fuels. This accomplishment aligns with the growing global demand for renewable energy solutions and contributes to a more sustainable future.

The facility enables advanced material synthesis for silicon, perovskite, quantum dot, and ultrahigh efficiency III-V multijunction solar cells. A variety of equipment and expertise enables research on diverse contacts, window layers, encapsulants, and packaging solutions. In addition, this facility houses state-of-the-art characterization, computational research, and basic science studies.

Processes to make solar cells include molecular beam epitaxy, metalorganic vapor transport deposition, thermal evaporation, and physical vapor deposition. Chemical (wet) processes are used to develop quantum dot, perovskite, and other materials for next-generation technologies. The facility also has clean room, photolithography, metallization, and other support facilities.

Computational studies include access to NREL"s Peregrine supercomputer, examining fundamental semiconductor physics and defect properties, computational device analysis, and investigating the attributes of thousands of potential material compounds yet to be studied in laboratories.

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