

PRESS RELEASE

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Fraunhofer ISE Researchers Receive Research Award from the Werner Siemens Foundation for their Vision to Develop Highly Efficient Solar Energy Systems

Prof. Dr. Andreas Bett, director of the Fraunhofer Institute for Solar Energy Systems ISE and professor of physics at the University of Freiburg, and Dr. Frank Dimroth, department head of III-V and Concentrator Photovoltaics at Fraunhofer ISE receive the research award of the Werner Siemens Foundation (WSS), endowed with one million Swiss francs. The award is based on their scientific work with III-V semiconductor compounds in the field of highly efficient photovoltaics. They, together with five other teams, are finalists in the competition for the foundation's "Project of the Century".

"We are very pleased that we were able to convince the jury with our concept of a particularly resource-saving and environmentally friendly generation of solar electricity and hydrogen," says Prof. Dr. Andreas Bett. "With our III-V multi-junction solar cells, we are already achieving efficiencies of up to 47.6 percent and are thus developing the world's most efficient technology for converting sunlight into electricity."

At the heart of the award-winning proposal is the vision of a resource-saving energy transition. To this end, the researchers want to make solar modules based on III-V multi-junction solar cells competitive. These modules generate at least 30 percent more power per square meter compared to today's solar modules made of crystalline silicon. At the same time, energy consumption in production is to be reduced by 75 percent. Based on their ideas, the award winners are to develop their plans for a WSS Research Centre and submit them by the end of October 2023. "Such a research center would enable us to help III-V solar technology achieve a breakthrough," says Dr. Frank Dimroth. "In doing so, we want to systematically develop production technology, minimize technological risks and show how solar hydrogen can be produced efficiently, sustainably and cost-effectively."

Converting the world's energy systems to renewable energy requires large amounts of resources. More efficient conversion processes help reduce the amount of land needed for solar modules. At the same time, the amount of semiconductor material used can be reduced by concentrating the sunlight. The researchers develop PV modules in which sunlight is concentrated up to 1000-fold and directed onto miniature solar cells. This saves material for module construction and up to 75 percent of the energy that would be needed to produce silicon solar modules today. These are important factors

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in making the energy transition more environmentally friendly and reducing CO₂ emissions in production.

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"I congratulate the researchers on this award," says Prof. Dr. Kerstin Krieglstein, rector of the University of Freiburg. "Research on solar cells is of great importance for Freiburg as a research location. Therefore, such a research center would be a great asset for the cooperation between the University of Freiburg and Fraunhofer ISE in the field of renewable energy."

The Werner Siemens Foundation launched the ideas competition for a WSS Research Centre dedicated to exploring "technologies for the sustainable use of resources" to mark its 100th anniversary. Researchers from Germany, Austria and Switzerland were invited to apply. Supported by an interdisciplinary project team, the Foundation Board and the Siemens Family Advisory Board selected six teams with their research ideas. Each of the finalist teams will be awarded a WSS research prize of one million Swiss francs. The award ceremony will take place at a colloquium in Lucerne on June 16, 2023.

The Werner Siemens Foundation is based in Zug, Switzerland. The philanthropic part of the foundation has been promoting outstanding innovations and talented young people in technical fields and the natural sciences since 2003. The foundation was established in 1923 in Schaffhausen by Charlotte von Buxhoeveden and Marie Graevenitz, née Siemens, the daughters of Carl von Siemens, who together with his brother Werner von Siemens had built up what later became the Siemens Group. The two founders were later joined by three other women from the Siemens family as benefactors.

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Prof. Dr. Andreas Bett is institute director of Fraunhofer ISE and part of the research team awarded the WSS research award. © Fraunhofer ISE



WSS Research Award Winner Dr. Frank Dimroth heads the research on III-V and concentrator photovoltaics at Fraunhofer ISE in Freiburg, Germany © Fraunhofer IS

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