Title: Functional Nanosystems - Towards a Multidisciplinary Indo-German Academic Collaboration and Network

Theme: Energy, Sustainability, and Climate

Principal Investigators:

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Short Project Summary

IISER Thiruvananthapuram and JMU Würzburg Launch Indo-German Partnership on Functional Nanosystems

Julius-Maximilians-University Würzburg (Germany) and IISER Thiruvananthapuram (India) have launched a strategic collaboration to advance innovation in *Functional Nanosystems*. The partnership combines IISER TVM's strengths in photochemistry and optoelectronics with JMU's expertise in nano-optics and molecular nanomaterials.

Research will focus on two areas: **Materials Chemistry**, developing nanostructures for health, energy, and environmental applications, and **Photonics**, exploring light–matter interactions to create next-generation optoelectronic and quantum devices.

The initiative also introduces new educational formats, including international mobility, hybrid teaching, and a joint master's-level *twinning program* in energy, sustainability, climate science, preparing globally connected scientists to tackle pressing challenges.

Expected Outcome:

The collaboration between IISER Thiruvananthapuram and JMU Würzburg is expected to generate significant advances in ***nanoscience*** research. By combining expertise in molecular nanomaterials, nano-optics, photochemistry, and optoelectronics, the project will lead to the design of novel nanostructures for applications in ***medicine, energy,*** and ***environmental monitoring***. It will also contribute to the development of advanced photonic and quantum devices, with particular emphasis on electrically ***tunable plasmonic nanoantennas*** that can drive innovations in ***optoelectronics*** and ***nanophotonics***.

In parallel, the initiative is designed to build capacity by training a new ***generation of scientists*** with interdisciplinary skills that bridge chemistry, physics, materials science, and engineering. A central outcome will be the establishment of a hybrid master's-level *twinning program* that integrates international exchange with advanced coursework in ***energy, sustainability, and climate science***. This program will provide young researchers with both the technical expertise and the global perspective required to tackle complex challenges.

The collaboration will also introduce new educational formats that combine ***hybrid teaching*** and ***international mobility***, ensuring broader and more equitable access to world-class STEM training. By pioneering these models, the project will serve as a template for future ***academic partnerships*** that emphasize inclusivity and global reach.

Finally, the partnership is expected to deepen Indo-German academic ties by creating a structured and ***long-term exchange framework between JMU and IISER TVM***. Beyond immediate research outputs, this sustained collaboration will strengthen institutional linkages and open avenues for future joint initiatives across other emerging scientific fields.

High Resolution Visuals:

TBD