



New DFG Priority Programme KOMMMA (SPP 2206)

“Cooperative Multistage Multistable Microactuator Systems”

Ongoing miniaturization and increase of demands on the functionality of microsystems generate an urgent need of innovative approaches for the control of, e.g., mechanics, optics or fluidics on a miniature scale. An important prerequisite is the smart coupling of distributed microactuators to a cooperative synergetic actuation system. This opens up the potential to generate new functionalities and thereby to fulfill complex tasks comprising combinations of force, displacement and dynamics that have not been possible until now. In the meantime, many different microactuators are developed and in use; yet, their systematic coupling to cooperative multistage or, for instance, multistable microactuator systems is still outstanding. Actual developments in microsystems technology concentrate mainly on sensors and sensor systems. The coherent cooperation of different microactuators will enable innovative “smart” systems solutions building a bridge to the success of today’s sensor technology.

In order to accelerate research on cooperative multistage multistable microactuator systems Deutsche Forschungsgemeinschaft (DFG) decided to establish the priority program SPP 2206, which will be funded for 2x3 years. The objective of this interdisciplinary SPP is to develop new theoretically founded concepts for understanding the complex coupling and synergy effects due to the combination of microactuators as well as to establish novel methods for development of innovative microactuator systems consisting of a cooperative and/or multistage design of similar or different actuators. The development of bi-/multistable mechanisms will be encouraged.

The SPP brings together research groups of the different disciplines of microactuation, microsystems, material science, system simulation, control and systems engineering and focuses their complementary expertise ranging from basic principles to demonstrator applications. The research programme of the SPP will focus on four core issues on different lengths and/or time scales:

(1) Basic understanding of coupling effects and cross-sensitivities that arise from the spatially confined arrangement of diverse microactuators and corresponding functional materials

(2) Identification and understanding of synergy effects resulting from promising combinations of microactuators, inherent sensing properties and multi-stable mechanisms

(3) Design and evaluation of architectures of multifunctional actuator systems for microsystems applications

(4) Development methods for microsystems applications including microtechnologies, integration and functionalization of actuator materials and supporting structures

Proposals are required to cover at least two of the core issues with emphasis on the fundamental issues (1) and (2) during the first funding period. Joint proposals will be encouraged that include cooperation across disciplinary borders. The number of principal investigators should reflect the complementary expertise needed for the proposed research. Proposals should aim at a comprehensive evaluation of cooperative multistage multistable microactuator systems (KOMMMA) addressing the route from fundamentals of design and engineering to innovative demonstrator systems for, e.g., micromechanical, -optical and -fluidic applications.

The development of single actuators and developments exclusively on technologies, materials or simulation tools will not be funded. Also, the development of any applications, e.g. robot and cyberphysical systems, will not be considered unless the proposals have a clear focus on cooperative multistage multistable microactuator systems.

Information Workshop for the new DFG Priority Programme SPP 2206

An information workshop will be held in Karlsruhe on 11 to 12 July 2018. If you plan to submit a project proposal within the SPP you are invited to participate in the workshop (one person per project proposal, minimally postdoc). Goal of this workshop is to bring together research groups from various disciplines on microactuation, microsystems, material science, system simulation, control and systems engineering. It is expected that short contributions and posters of the participants enhance the interdisciplinary collaborations and establish networks for the proposals of SPP 2206, which will be due autumn 2018.

Please register for the workshop by sending a project outline (1, max. 2 pages) by 18 June 2018 to Manfred Kohl (manfred.kohl@kit.edu).

Workshop venue: Karlsruhe Institute of Technology KIT,
Institute of Microstructure Technology (IMT)
Hermann-von Helmholtz-Platz 1,
76344 Eggenstein -Leopoldshafen

Preliminary schedule: 11.07.2018, 13.30 h: Start of workshop
20:00 h: Dinner
12.07.2018, 12:30 h: End of workshop

A detailed program will be sent by end of June

Organizer: Prof. Manfred Kohl, Karlsruhe Institute of Technology KIT
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