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Nature as model for technical sensors

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Abstract

Sensors and sensing are essential for all forms of life. Correspondingly there is a fascinating richness and diversity of sensory systems throughout the animal kingdom. Animals use sensory input not only for communication, but also for the detection, discrimination and localization of animate and inanimate objects. In addition sensory systems provide basic cues for spatial orientation and navigation. Both, the structure and the physiology of sensory systems reflect the natural environment in which an animal lives and the needs of the animal. Accordingly, the relevant and often complex stimuli and noise conditions, which natural sensors evolved to cope with, have to be found and applied, to fully understand any sensory system. This is a particular challenge in cases where animals show sensory capabilities alien to human perceptions.

This talk will focus on two sensory systems that humans and most animals do not have: the infrared sensory system of pyrophilous beetles and the electrosensory system of weakly electric fish. I will show that these sensory systems not only have remarkable features but can also be used as a model for the development of novel technical sensors.