Mechanistic Investigation of the Isomerization of New (and Old) Photoswitches

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Photochemically driven molecular switches and unidirectional molecular motors represent a fascinating fundamental research topic that has found prospective applications in smart materials and biomedical sciences.[1,2] However, synthesizing molecules tuned for a specific task requires a deep understanding of their motion.

This talk will focus on selected examples of applying the toolboxes offered by organic synthesis, spectroscopy, computational chemistry, and physical organic chemistry to predict, construct, and investigate photochemically driven switches and motors (Fig. 1).[3-8] This approach allows the understanding of the behavior of new structures and the discovery of the mechanisms underlying their movement at the molecular scale.

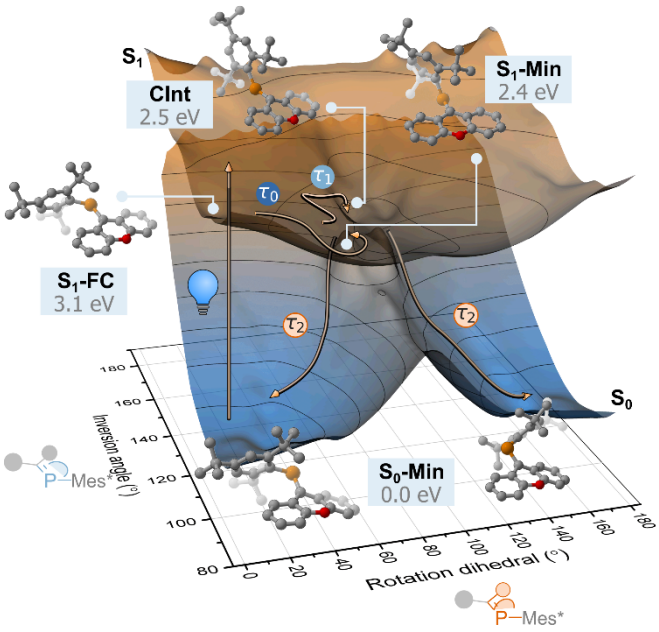

Figure 1. C=P isomerization about the central C=P bond of a novel phosphaalkene switch.[8]

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Stefano Crespi received his Ph.D. in 2017 at the University of Pavia (Italy). He won a two-year fellowship as a Post-Doc in the same University focusing on the study of novel heteroaryl azo photoswitches. He joined the workgroup of Burkhard König at the University of Regensburg, where he studied new scaffolds based on heteroaryl azo dyes and novel photocatalytic transformations. In 2019 he moved to Groningen to work on molecular motors in the group of Ben Feringa as a Marie Skłodowska-Curie fellow. Stefano is now a Tenure Track Assistant Professor in Organic Photochemistry in the Synthetic Molecular Chemistry Program of the Ångström Laboratory of the University of Uppsala. His research concerns the understanding and controlling of the molecular motion at the nanoscale triggered by light.