

Not available anywhere else, this groundbreaking volume presents a novel and unique approach to understand the complex chemical network behind the internal network structure of plants, a valuable tool for students of physics, biological physics, chemistry and biology, but also for sociologists and economists as well as for scientists in any field.

Photosynthesis and the complex network within plants is becoming more important than ever, because of the earth's changing climate. In addition, the concepts can be used in other areas, and the science itself is useful in practical applications in many branches of science, including medicine, biology, biophysics, and chemistry. This original, groundbreaking work by two highly experienced and well-known scientists introduces a new and different approach to thinking about living organisms, what we can learn from them, and how we can use the concepts within their scientific makeup in practice.

This book describes the principles of complex signalling networks enabling spatiotemporally-directed macroscopic processes by the coupling of systems leading to a bottom-up information transfer in photosynthetic organisms. Top-down messengers triggered by macroscopic actuators like sunlight, gravity, environment or stress lead to an activation of the gene regulation on the molecular level. Mainly the generation and monitoring, as well the role of reactive oxygen species in photosynthetic organisms as typical messengers in complex networks, are described. A theoretical approach according to the principle of synergetics is presented to model light absorption, electron transfer and membrane dynamics in plants. A special focus will be attended to nonlinear processes that form the basic principle for the accumulation of energy reservoirs and large forces enabling the dynamics of macroscopic devices.

This volume is a must-have for any scientist, student, or engineer working with photosynthesis. The concepts herein are not available anywhere else, in any other format, and it is truly a groundbreaking work with sure to be long-lasting effects on the scientific community.

Reactive Oxygen Species:

- Introduces a groundbreaking approach for understanding hierarchical networks in plants
- Introduces Reactive Oxygen Species (ROS) as "messengers" within the complex network of the photosynthesis process
- Suggests how the presented concepts can be used to describe other biological principles and multiscale hierarchical systems in society, politics and economy
- Provides cutting-edge research not available anywhere else in any other format

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