1. Record Nr. UNINA990001092410403321

Autore	Bolton, W.
Titolo	Physics Experiments and Projects / W. Bolton
Pubbl/distr/stampa	New York [etc.] : Pergamon Press, 1969
Descrizione fisica	xv, 121 p. ; 23 cm
Collana	The Commonwealth and International Library
Disciplina	530
Locazione	FI1
Collocazione	20A-142.004
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Vol. 5: Mechanics

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Autore	Serra Roberto
Titolo	Protocells and the Origin of Life / / by Roberto Serra, Marco Villani
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	3-031-91763-4
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (274 pages)
Collana	The Frontiers Collection, , 2197-6619
Altri autori (Persone)	VillaniMarco
Disciplina	530.1
Soggetti	System theory Evolution (Biology) Biophysics Complex Systems Evolutionary Biology
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Formato	Materiale a stampa
Livello bibliografico	Monografia

Nota di contenuto	Setting the stage -- An overview of our main conceptual tool -- A bird’ s eye view on cells -- Origins -- Spontaneous organization -- Self-organization in chemical reactions -- Collective self-replication in chemical reactions -- Protocells and synchronization -- Polymers in protocells -- Conclusions.
Sommario/riassunto	How life can emerge in a lifeless environment is one of the major open scientific challenges. This book pays particular attention to self-organization phenomena that might have led to the appearance of the first protocells, i.e. cell-like structures, much simpler than present-day cells, endowed with some primitive kinds of metabolism and heredity. After a brief description of the known facts and main hypotheses, mathematical and computational models of protocells are discussed: they should complement laboratory experiments, allowing rapid explorations of the dynamical properties of several alternative types of protocell architectures. Given the great uncertainties about the actual origin of life, it seems impossible to provide a detailed and complete reconstruction of the first life forms. It is therefore necessary to identify plausible pathways, highlighting the main physical and chemical processes “towards life” that can take place. Generic models, which are abstract enough to encompass different specific hypotheses, are particularly relevant, as they allow one to identify properties which are common to several different detailed scenarios. They are widely discussed, and a particular case is described in detail, namely that of synchronization between the rate of molecular replication and that of reproduction of the whole protocell, which is a necessary condition for sustainable growth of a population and a prerequisite for further evolution. Using generic models, it is shown that such synchronization spontaneously emerges in successive generations, under very general assumptions. The book also contains extensive descriptions of the emergence of long polymers, of autocatalytic sets and of the interactions between protocells and their environments. The book is not meant only for specialists, but also for scientists working in different fields, as well as for laymen with an interest in science. It requires a basic knowledge of chemistry and biology, and an interest in simulation models.