

1. Record Nr.	UNINA9910782578303321
Autore	Funaro Daniele <1958->
Titolo	Electromagnetism and the structure of matter [[electronic resource] /] / Daniele Funaro
Pubbl/distr/stampa	Hackensack, NJ, : World Scientific, c2008
ISBN	1-281-96814-5 9786611968144 981-281-452-3
Descrizione fisica	1 online resource (200 p.)
Disciplina	530.14/1
Soggetti	Electromagnetism Matter
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 185-188) and index.
Nota di contenuto	1. Something is wrong with classical electromagnetism. 1.1. Maxwell equations and wave-fronts. 1.2. Wave-front propagation. 1.3. Fronts from an oscillating dipole. 1.4. Preliminary conclusions -- 2. First steps towards the new model. 2.1. Modified Maxwell equations. 2.2. Perfect spherical waves. 2.3. Travelling signal-packets. 2.4. Lagrangian formulation. 2.5. Free-waves and the eikonal equation. 2.6. Lorentz invariance -- 3. Interaction of waves with matter. 3.1. Wave bouncing off an obstacle. 3.2. Diffraction phenomena. 3.3. Adding the mechanical terms. 3.4. Properties of the new set of equations -- 4. The equations in the framework of general relativity. 4.1. Preliminary considerations. 4.2. The energy tensor. 4.3. Unified field equations. 4.4. The divergence of the magnetic field -- 5. Building matter from fields. 5.1. Adding the pressure tensor. 5.2. On the existence of particle-like solutions. 5.3. Looking for 2-D constrained waves. 5.4. Neutrinos, electrons and protons. 5.5. Connections with a Dirac type equation -- 6. Final speculative considerations. 6.1. Towards deterministic quantum mechanics. 6.2. Conclusions.
Sommario/riassunto	The classical theory of electromagnetism is entirely revised in this book by proposing a variant of Maxwell equations that allows solitonic solutions (photons). The Lagrangian is the standard one, but it is

minimized on a constrained space that enforces the wave packets to follow the rules of geometrical optics. Exact solutions are explicitly shown; this opens a completely new perspective for the study of light wave phenomena. In the framework of general relativity, the equations are written in covariant form. A coupling with the metric is obtained through the Einstein equation, whose solution
