Gli articoli contenuti nel volume sono presentati da parte di fisici interessati allo studio degli aspetti cooperativi e di chimici che danno un certo numero di elementi sulla preparazione e sulla sistematica di questi composti o sulla possibilità di preparare nuovi composti "progettati" per mostrare proprietà di tipo superconduttivo.

Ritengo questo libro un utile testo di riferimento per chi voglia documentarsi sulle ricerche fisiche recenti nei composti metallorganici unidimensionali.

C. RIZZUTO


This book is a collection of papers in honour of the fifty years of scientific activity of D. D. IVANENKO; and all essays are more or less connected with his interests in nuclear physics, gravitation theory, synchrotron radiation, nonlinear spinor theory, etc.

For instance, the Editor, A. A. SOKOLOV, further develops the theory of synchrotron radiation in relation to galaxy emission, storage rings, superstrong magnetic fields or ultrarelativistic electrons, and the gravitational synchrotron radiation.

IVANENKO himself, with SARDANASHVILI, contributes a new work centered on the introduction of space-time torsion, alongside with curvature, and its physical consequences (for example suggesting an interesting rôle of torsion inside elementary particles).

The book consists of 26 articles (all with English abstract), 18 in Russian and 8 in English; the latter—for instance—being signed by authors as J. A. WHEELER; C. MÖLLER; K. NISHIJIMA and R. SASAKI; G. WATAGHIN; Y. CHOQUET-BRUNAT; J. WEBER and V. TRIMBLE; W. B. BONNOR; and P. VAIDYA.

The main subjects dealt with—briefly speaking—in the volume are: i) discussion of the foundations of general relativity (GR) (TREDER; MÖLLER; CHOQUET-BRUNAT); ii) new solutions of Einstein equations (BONNOR; VAIDYA); iii) applications of GR in cosmology and astrophysics (SOKOLOV; SEXT; STREERUWITZ and GIESSWEIN; PONTECORVO; SCHUTZER; DE SABBATA et al.; MARX and GAIzAGO; WATAGHIN; MATSUROV); iv) gravitational waves (WEBER and TRIMBLE; GRATS and GALTsov); and—going beyond GR—: v) pre-geometry (WHEELER); vi) compensation theory, leading to torsion and nonlinear spinor equation (IVANENKO and SARDANASHVILI); torsion theory (REHL; PONOMARIOV and KRECHET). Other interesting topics are covered by BAZANSKI; NISHIJIMA and SASAKI; BLOKHINtSEV, EFREMov and Shirkov; BAGrov, GITman and KUCHIN; TAKABAYASI; TAKWALE and TELI; KOLESNOKOV and VMYATNIN.

The book begins with a critical survey, by H. J. TREDER, of the evolution of concepts like inertia and gravity from Lucretius to Einstein, paying attention also to the philosophical aspects.

Then MÖLLER presents, with pedagogical purposes, his views about still controversial questions as the measurability of quantities occurring in GR and the general principle of relativity.

M. GIESSWEIN, R. SEXT and E. STREERUWITZ try to avoid the occurrence of cosmological singularities by vacuum polarization effects, even if the ones considered by them are not enough to fulfil such an aim—as they conclude.

CHOQUET-BRUNAT proves the existence of solutions for the constraint equation of GR, on a compact 3-dimensional manifold without boundary, for geometries in the Sobolev space $H_4$.

BONNOR analyses Bertotti's solutions of Einstein-Maxwell equations, by classifying them, studying their geodetics and attempting a physical interpretation.
VAIDYA develops a simple formalism, using a real tetrad system (differently from NEWMAN, PENROSE or PLEBANSKI) to investigate the properties of a geodetic null-congruence in Minkowski space-time.

TRIMBLE and WEBER yield an exact solution for the response of a (loss free) gravitational-radiation detector to calibration pulses.

WHEELER considers that 3-geometry does not give a correct account of physics—and ought to be replaced by a more basic structural concept or pregeometry—for the following five reasons: mathematical space does not tear, but physical space must tear; mathematical space has only geometrical properties (surface geology) but physical space seems to be full of virtual pairs of all kinds of particles (geological strata); it is difficult to avoid the impression that every law of physics is mutable under sufficiently extreme conditions, and therefore geometry itself—a part of physics—must also be mutable; Einstein's law for the dynamics of geometry merely follows from the group of deformations of a spacelike hypersurface and therefore tells nothing more about the underlying structure than crystallography tells about the structure of atoms; gravitation, as the metric elasticity of space, is as far removed from the deeper physics of space as elasticity from the deeper physics of solids. Pregeometry should underline both geometry and fundamental particles. From our point of view, these interesting points are connected with the researches attempting to attribute classical meaning (in terms of tachyons) to virtual particles: actually such a research recently met the problem of extending Minkowski space-time $M^4$ to a six-dimensional $M(3, 3) = M^6$ or to a $C^6$ space. Going back to WHEELER, he concludes that the ordinary concept of ideal mathematical geometry as applied in physics is too finalistic to be final (and must give way to a deeper concept of structure).

G. WATAGINH, in a brief note, shows how the production in two-particle collisions with high c.m. energy must be strongly multiple (owing to unitarity, energy conservation and cut-off considerations).

We already mentioned the paper by IVANENKO and SARDANASVITY: let us here quote their suggestions of non-linear quarks (similarly to Salam's and to Caldirola-Pavšič-Recami's)—on the one hand—and of a discrete, primordial entity—on the other hand—where no distinction between space and matter yet exists and which is governed by a primordial pre-spinor.

F. W. HEIL, in a long paper, looks for the energy tensor which gives the correct local distribution of the energy of spinning, massive matter fields (localization energy). The author's alternative includes spin on a dynamical basis and leads to $U_4$ theory (GR plus torsion), i.e. to a space-time described by a Riemann-Cartan geometry.

V. G. KRECHET and V. N. PONOMARIOV consider, e.g., a new solution of Einstein equations, together with the equations of a massive vector field for static systems, and show that in some cases a spinless fluid reaches the singularity in an infinite time (even in the rest frame of the fluid). With regard to the gravitational theory with torsion, they pay special attention to neutrino dynamics.

B. M. PONTECORVO claims that CP violation in a hot universe can have caused its apparent baryon-antibaryon asymmetry and nonzero strangeness.

DE SABBATA, FORTINI, GUALDI, BOCCALETTI and FORTINI-BARONI, in an interesting contribution, apply to a neutron star their study of magnetic bremsstrahlung from the intrinsic magnetic-dipole moment of a neutron accelerated in a nuclear potential; they show that the $\gamma$-rays so produced can cool the neutron star in a much shorter time than via $\nu-\bar{\nu}$ emission or surface electromagnetic radiation.

The paper by SOKOLOV has been already mentioned; here we want to
add that it starts by deriving the classical formula for synchrotron radiation of an electron moving along a screw.

Also the paper by E. Schmutzer is noticeable, where an approximation of the hydromechanical-thermodynamical fundamental equations of GR is considered, and its application to a new theory of the magnetic fields in celestial bodies is performed (e.g. for Earth-like, Sun-like and pulsarlike objects); numerical estimates suggest that the theory can be experimentally checked.

E. Gayzago and G. Marx review the possibilities that weak electron-proton interactions (neutral-current couplings) could produce parity impurities in atomic and molecular spectroscopy; for instance, they discuss the experimental implications in the case of mirror molecules.

N. Matsukov investigates chemical composition and equations of state of superdense matter in astrophysics up to $10^{20} \text{g/cm}^3$.

D. V. Gal'tsov and Yu. V. Grats formulate, in a fully Lorentz-covariant approach, the problem of the gravitational radiation emitted during (non-bound) encounters of relativistical bodies and briefly discuss the connections with other methods as the virtual-graviton approach.

Interesting is also the paper by S. L. Bazanski, who considers the dynamics of a perturbation in classical field theory by discussing the properties of Jacobi field and the connection between Jacobi equations and the principle of stationary action in field theories (and then deriving the first integrals of those equations). He is led, e.g., to generalize the concept of Jacobi field.

Nishijima and Sasaki give an account of a formulation of field theories based on unitarity and dispersion relations; they derive in such a formalism the anomalous Ward-Takahashi identities.

D. I. Blokhintsev, A. V. Efremov and D. V. Shirkov put forth renormalization group functional equations for theories with dimensional (in particular with negative mass dimensions) coupling constant, and establish the structure of general solutions of the equation for invariant charge; they discuss also scale invariance at small distances.

V. G. Bagrov, D. M. Gitman and V. A. Kuchin consider some semi-classical versions of quantum electrodynamics; in all cases, they connect the arising of an external field with the presence of coherent, or semi-coherent, states.

T. Tokabayasi develops a manifestly general-covariant approach to relativistic string theory, for a unified description of hadrons, and then analyses the more restricted conformal-invariance case.

R. G. Takwale and M. T. Teli study the elliptic relation between degrees of polarization of scattered particles.

And, finally, N. N. Kolesnikov and V. M. Vymanin investigate the structure of the atomic (nuclear) mass formulae in a model-independent fashion.

E. Recami


Nella serie dei Topics in Applied Physics della Springer-Verlag il volume 5 è dedicato alla spettroscopia Mössbauer ed è rivolto ai ricercatori interessati a quanto è stato fatto e quanto ancora può essere fatto con questa tecnica.