

1. Record Nr.	UNINA9910457793303321
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Titolo	Introduction to the anisotropic geometrodynamics [[electronic resource] / / Sergey Siparov
Pubbl/distr/stampa	Hackensack, N.J., : World Scientific, 2012
ISBN	1-280-37399-7 9786613555366 981-4340-84-7
Descrizione fisica	1 online resource (318 p.)
Collana	Series on knots and everything ; ; v. 47
Disciplina	530.11
Soggetti	Geometrodynamics Anisotropy Relativity (Physics) Space and time Gravitation Electronic books.
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 and index.
Nota di contenuto	Preface; Contents; 1. Classical relativity: Scope and beyond; 1.1 Physics and mathematics: Long joint journey; 1.1.1 From Pythagoras to Kepler and Newton; 1.1.2 Curvature, forces and fields; 1.2 Inertial motion, relativity, special relativity; 1.2.1 Bradley experiment; 1.2.2 Michelson and Morley experiment; 1.2.3 Lorentz contraction; 1.2.4 Special relativity; 1.3 Space-time as a model of the physical world; 1.4 Generalized theory of relativity and gravitation; 1.4.1 Tensors: who and why; 1.4.2 Maxwell identities; 1.4.3 Least action principle; 1.4.4 Mass and energy; 1.4.5 Field equations 1.4.6 Gravitational waves 1.5 GRT - first approximation - predictions and tests; 1.5.1 Newton gravity; 1.5.2 Classical tests; 1.5.2.1 Gravitational redshift; 1.5.2.2 Orbit precession; 1.5.2.3 Deflection of a light beam; 1.5.3 Gravitational lenses in GRT; 1.6 Exact solutions; 1.6.1 Star: static spherically symmetric case; 1.6.2 Universe: cosmological constant and expansion; 1.7 Observations on the cosmological scale; 1.7.1 Rotation curves and their interpretation; 1.7.2 Break of linearity in

Hubble law; 2. Phase space-time as a model of physical reality; 2.1 Preliminary considerations
 2.1.1 Scales 2.1.2 Boundaries; 2.1.3 Newton and Minkowski models for the intuitive space and time; 2.2 Interpretation dilemma, variation principle, equivalence principle; 2.2.1 Dilemma: new entity or new equations; 2.2.2 Comparison of methods; 2.2.3 On the variation principle; 2.2.4 On the equivalence principle; 2.3 Construction of the formalism; 2.3.1 Space and metric; 2.3.2 Generalized geodesics; 2.3.3 Anisotropic potential; 2.3.4 Field equations; 2.3.5 Back to Einstein method; 2.4 Gravitation force in anisotropic geometrodynamics; 2.5 Model of the gravitation source and its applications
 2.5.1 Center plus current model 2.5.2 Flat rotation curves of spiral galaxies; 2.5.3 Tully-Fisher and Faber-Jackson relations; 2.5.4 Logarithmic potential in spiral galaxies; 2.5.5 Classical tests on the galaxy scale; 2.5.5.1 Orbit precession; 2.5.5.2 Gravitational redshift; 2.5.5.3 Light bending; 2.5.6 Gravitational lenses in AGD; 2.5.7 Pioneer anomaly; 2.6 Electrodynamics in anisotropic space; 2.6.1 Weak deformation of locally Minkowski metrics; 2.6.2 Lorentz force; 2.6.2.1 Variational principle; 2.6.2.2 Example f-1; 2.6.2.3 Example f-2; 2.6.2.4 Example f-3; 2.6.2.5 Example f-4
 2.6.3 New term - "electromagnetic" vs. "metric" 2.6.4 Currents in anisotropic spaces; 2.6.4.1 Example c-1; 2.6.4.2 Example c-2; 2.6.4.3 Example c-3; 2.6.4.4 Example c-4; 2.7 Approaching phase space-time; 2.7.1 Coordinate-free dynamics; 2.7.2 Generalized Lorentz transformations; 2.7.3 Geometry, groups and their contractions; 2.8 Cosmological picture; 3. Optic-metrical parametric resonance - to the testing of the anisotropic geometrodynamics; 3.1 Gravitation waves detection and the general idea of optic-metrical parametric resonance; 3.1.1 Space maser as a remote detector of gravitation waves
 3.1.2 Atomic levels

Sommario/riassunto

The aim of the book is to provide a new and fruitful approach to the challenging problems of modern physics, astrophysics, and cosmology. The well-known observations of the flat rotation curves of spiral galaxies and of the gravitational lensing effect greatly exceeding the expectations based on the classical GRT can be explained without bringing in the notion of dark matter. The Tully-Fisher law and the unusual features of globular clusters' motion become clear. It also turns out that new features appear in the cosmological picture that involves the Universe expansion and the acceleration of