

MAGNETISM AND GRAVITY. A UNIFIED TREATMENT

HANS WILHELM ALT

Technische Universität München, Fakultät für Mathematik
Boltzmannstr. 3, DE-85747 Garching bei München, Germany
(E-mail: alt@ma.tum.de)

Abstract. In this paper we present a unified theory for gravitation and magnetization including electrodynamics. It is based on Maxwell's equations which in the form of Ampère's circuital law is the antisymmetric part of this theory, and the symmetric part is the gravity, which contains Newton's gravitation in the time-dependent relativistic version. Since magnetism and gravity are formulated in one system of differential equations, this new theory combines these two parts, and therefore this combination will probably bring some new insight to related problems which are discussed these days.

We further study the related force in the mass-momentum system. This force consists of the well-known Newton force and the well-known Lorentz force. We show that they are exactly those forces that are predicted by our theory. We prove that these forces are equal to the divergence of a 4-flux in the mass-momentum equation. In this way these forces can be considered as internal expressions. In the proof all 4-fields of the new theory have to be 4-gradients of vector potentials, which is a well-known assumption.

Communicated by Editors; Received December 31, 2019

Mathematics Subject Classification (MSC 2010): 35Q75, 35Q35, 35D05, 35Q61.

Physics and Astronomy Classification Scheme (PACS): 95.30.Sf, 04.50.Kd, 12.10.-g, 03.50.De, 96.12.Fe, 96.15.Ef.

Keywords: Relativity, Unified field theory, Gravity, Maxwell equation, Partial differential equations.