

A PARTICLE-TIED AETHER:

INDICATIONS OF A DEEPER FOUNDATION FOR PHYSICS AND RELATIVITY

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Basic concepts. This contribution[†] is primarily about the transmission of transverse electromagnetic (TEM) waves, our principal source of physical information. Relativity, as its name implies, seeks to describe relationships between entities in various circumstances but doesn't illuminate the nature of those entities, a gap that quantum electrodynamics and particle physics try to fill. A variety of well-observed phenomena, to be outlined below, appear inconsistent with this currently accepted framework of physics. It will be shown that these phenomena indicate the need for a physics framework that admits the occurrence of TEM-wave transmission effects, a factor explicitly denied in the conceptual basis of Special Relativity (SR). To help with these matters, a continuum (aether) theory (CT) of physical nature is outlined in which particles are special, rather (but finitely) concentrated, mainly-rotational forms of disturbance of the continuum. Particle random motions imply random motion of the aether, and this affects the propagation of TEM waves by it. Under this proposal particles are "made" of aether (originally a suggestion of Larmor, 1894), and the Michelson-Morley result is satisfied. The relativity principle, that nothing can exceed the *local* velocity of TEM waves, will be firmly retained but regarded as only strictly applicable at the smallest scale of physical nature - that of the local aether.

Aether is seen as an all-pervading compressible superfluid of electric charge whose compressibility derives from the mutual repulsion of its constituent charge. Thus spatial differences in aether density (however caused), represent spatial differences in electric charge density and set up aether pressure differences that everywhere attempt to smooth them out. To transmit transverse, or shear, waves appeal is made to the electromagnetic field induced in the surrounding aether by the transverse displacement of aether, i.e. electric charge, associated with the E-vector of the wave. This electromagnetic field stores the energy with which to restore the displaced aether as the E-vector falls, thereby providing by dynamic means the required elasticity in shear despite the superfluid nature of aether. The aether provides a vehicle for the "dielectric displacement current" of Maxwell, which has hitherto been lacking.

[†] Updated and revised November 2000, mostly from an earlier, more comprehensive version (PIRT V, Late Papers, pp. 182-198, May 1997) in which more extensive references may be found, but partly from some even earlier work (published as PIRT V, Supplementary Papers, pp. 241-253, July 1998). Initial assistance with the present version, by Prof. Mogens Wegener, Aarhus University, in an editorial role is gratefully acknowledged.