

# ETHER AND MAXWELLS CURL-OPERATORS

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## Abstract:

It is shown that the curl operators of Maxwells electromagnetic equations prove the existence of a quasi-continuous, i.e. substantial ether medium. Finally, the key question of modern physics is posed: What's your take on time dilation, big bang, and black holes?

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**Keywords:** Electrodynamics, ether, relativity theory, Maxwell, Einstein.

## § 1. QUASI - KONTINUA

(1a) Since around 1600, the leading physicists have been convinced that:

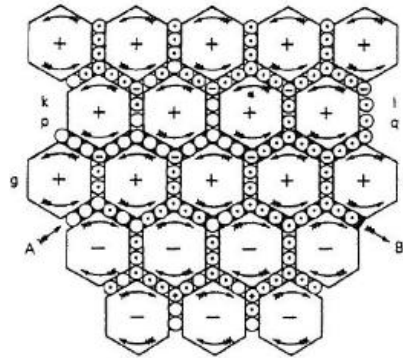
The **transmission** of light waves and gravitational forces **requires** the existence of an **ethermedium**.<sup>1</sup>

(1b) The world's best-known **ether model** is probably the **molecular-vortex** model of **Maxwell**.<sup>2</sup> (See **Fig. 1**)

ABB. 1

Nach Maxwell breiten sich **elektromagnetische Felder** im Äther aus:

- (a) durch **elektrische Äther-Teilchen** und  
(b) entsprechende **magnetische Molekular-Wirbel**.



Quellen: **Sambursky** (1975), (16), Die **magnetischen** Molekularwirbel und die Zwischenlagen der **elektrischen** Teilchen, S. 554,  
**Genz** (1994), (8), **Äther und leerer Raum** Abb. 79c, S. 268/269,  
**Simonyi** (2004), (20), **Vorstellungen Maxwells**, Erklärung: S. 345, Bild: S. 347,  
sowie **sehr** ausführlich in **Siegel** (1991), (19), Fig. 3.1 und 2, S. 67/69.

<sup>1</sup>Schaffner (1972), (17), The Functions of the Aether, p. 3-6, The Historical Background, p. 7-19

<sup>2</sup>Siegel (1991), (19), The elaboration of the molecular-vortex model, p. 56-84

- (1c) With this molecular vortex model, Maxwell wanted to interpret **magnetic** fields as mechanical rotations.<sup>3</sup> Accordingly, Maxwell used curl operators to mathematically present the field equations of the ether medium.<sup>4</sup>
- (1d) A closer look at Maxwell's **molecular vortex** model of the ether (**Fig. 1** above) shows that the processes **shear**, **slippage** and **rotation** are of great importance.<sup>5</sup>
- (1e) For this reason, the functioning of shear, sliding and rotation in **ordinary** bodies and media is examined in more detail below.<sup>6</sup>
- (1f) The fact that all ordinary bodies consist of material **particles** is mostly **meaningless** in mechanics.<sup>7</sup>
- (1g) For this reason, ordinary bodies are often regarded as material **continua**.
- (1h) Correspondingly, the deformations of ordinary bodies are also regarded as **continuous**.<sup>8</sup>

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<sup>3</sup>Siegel (1991), (19), Elaboration of the molecular-vortex model, p. 68-69. – see also Meyenn (1998), (14), Die zweite Abhandlung, **2. Band**, S. 17-19

<sup>4</sup>Siegel (1991), (19), Introduction, p. p. 1 — Elaboration of the molecular-vortex model, p. 60, 68 and Introduction of the displacement current, p. 87

<sup>5</sup>Siegel (1991), (19), Fig. 2.2, p. 41, Fig. 3.1, p. 67/69, text: p. 75-82. – See also Sommerfeld (1949), (22), Die Rolle der Lichtgeschwindigkeit / Lichtäther, 38 below – and J Die **Prinzipien** der der der **Konstanz** der **Lichtgeschwindigkeit** und der Ladung, p. 241-242

<sup>6</sup>Sommerfeld (1949), (22), Energiesatz und Poynting Vektor, p. 30 before Eq.(6c). – Sommerfeld (1945), (23), §15, The quasi-elastic body as an ether model, pp. 104-106

<sup>7</sup>Einstein (1934), (3), Maxwells Einfluss auf die Auffassung vom phys. Real, p. 179

<sup>8</sup>Betten (2001), (1), Einführung, S. 2

- (1i) Because of this continuity of the Bodies they can be described with partial differential equations.<sup>9</sup>
- (1j) In **reality**, however, **ordinary** bodies consist of discrete **particles**. As a result, they can be split – e.g. by breaking after overloading.
- (1k) Conclusion: **Ordinary** solids are **not real** continua or entities, which is why they are called „**quasi-continua**“ here.

(1l) **The quasi-continuum** (definition):

- (111) A **quasi-continuum** consists of **discrete particles**, which are themselves considered inseparable (or of „atomic“ kind).
- (112) In the **normal state** these particles are more or less **fixed** to neighboring particles.
- (113) However, these particles can be **separated** from each other by sufficiently large **external influences**.
- (114) **After a separation**, particles can **reconnect** with sufficiently close **other** particles **again firmly**.

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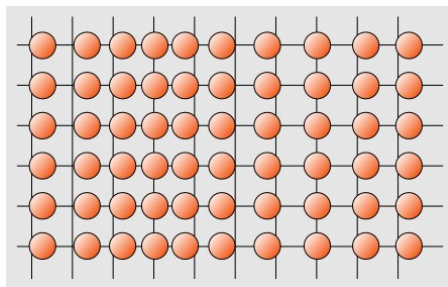
<sup>9</sup>Betten (2001), (1), 3.3 Lösungsmethoden der Elastizitätstheorie, p. 120-128

## § 2. THE CURL-THESIS

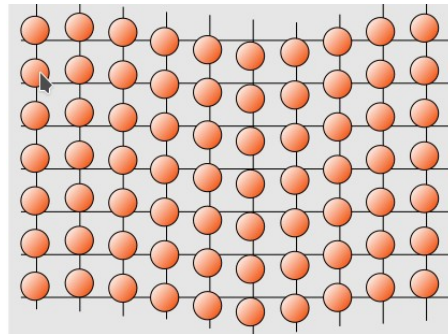
- (2a) Transverse waves arise (only) in a quasi-continuum by deflecting certain **particles differently far – across or transversal to the propagation direction.**<sup>10</sup>  
 (See the **right** image of **Fig. 2** (below):<sup>11</sup>)

ABB. 2

Wellen in einem Teilchengitter (von links nach rechts laufend)  
 (links:) **longitudinale Welle** (rechts:) **transversale Welle.**



Bei jeder (reinen) Dehnung bleiben Teilchen bei den selben Nachbarn.



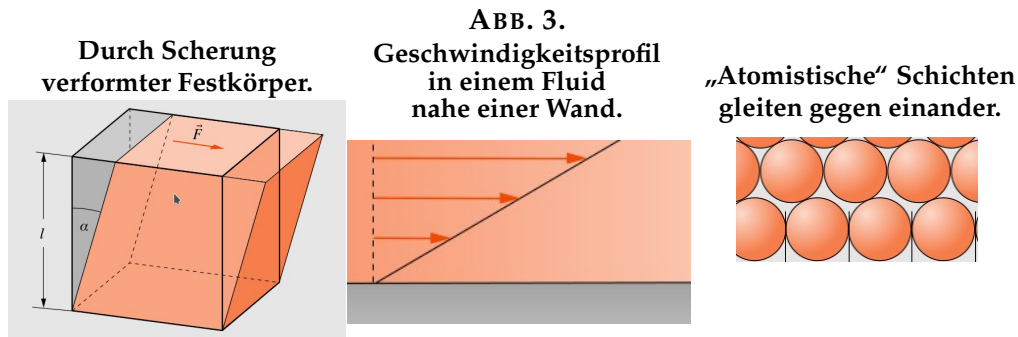
Bei jeder Scherung werden Teilchen in Richtung neuer Nachbarn verschoben.

Quelle: Meschede (2015), (13) – Gitterschwingungen, S. 882, Abb. 18.34

- (2b) The state of a body in which neighboring layers of particles are **differently wide (transverse) deflected** is called **shear**.
- (2c) A cube model can be used to explain shear in a descriptive way. (See the **left** image of **the** following **Fig. 3**)

<sup>10</sup>Meschede (2015), (13), 18.2.2 lattice dynamics, p. 882

<sup>11</sup>Meyenn (1998), (14), Die zweite Abhandlung, 2. Bd., p. 18



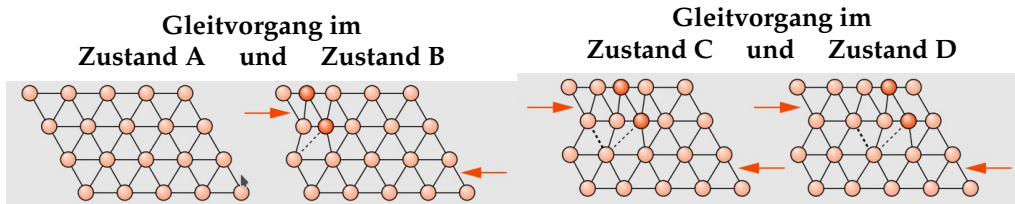
Quelle: Meschede (2015), (13), Abb. 4.5, S. 141 — Abb. 3.23, S. 11 — Abb. 3.25, S. 112.

- (2d) When a cube body is in the state of **shear**, two of its **square** sides are turned or **rotated** by a (very small) **angle**  $\alpha$ <sup>12</sup> – see the **left** image of **Fig. 3** (above).
- (2e) Also in **liquids shearing** takes place – see the **middle** image of **Fig. 3** (above).
- (2f) Shearing processes in liquids are usually called **sliding** to indicate that **liquidsolidlayers** slide over each other.<sup>13</sup>
- (2g) Because **sliding** is of particular importance in this article, the corresponding processes are illustrated in more detail using four sliding states. (See images A to D of **Fig. 4** below).
- (2h) Regarding **Fig. 4**, mainly the **2nd particle** of the **2nd row** is considered with regard to the particles of the **3rd row** – and then called the **sliding particle**.

<sup>12</sup>Sommerfeld (1945), (23), §1. Fundamentalsatz der Kinematik, S. 7-8 und S. 14

<sup>13</sup>Meschede (2015), (13), 3.3.5 **Viscosity and internal friction**, p. 111-112, Fig. 3.23

ABB. 4



Quelle: Meschede (2015), (13), 18.5.4 Versetzungen, Abb. 18.80, S. 915

- (2h1) **State A:** The **sliding particle** is bound in particular to the two parts 1 and 2 of the 3rd row.
- (2h2) **State B:** The **sliding particle** is already shifted slightly to the right, but is still connected to the two parts 1 and 2 of the 3rd row.
- (2h3) **State C:** The **sliding particle** is shifted even further to the right.
- (2h4) **State D:** The **sliding particle** is now **detached** from **particle 1** of the 3rd row **detached** and **connected** to the two **parts 2 and 3** of the 3rd row **new**.
- (2i) **Not** immediately **obvious** in the above considerations (2transversh) is an important fact – which is already indicated in the description of shear in (2d):
- Slide** causes a **process** which can be regarded as **rotation**.
- (2j) This fact leads to the rotation thesis (2k).

- (2k) **The rotation thesis:**  
 If **adjacent layers of particles** of a quasi-continuum **slide relative** to each other – or against each other –, certain **local** areas of particles are set into **rotation**.
- (2l) To enable such (groups or areas of) locally rotating particles, Maxwell introduced electric „idle wheels“<sup>14</sup> in his molecular vortex model – shown in Fig. 1 above.<sup>15</sup>
- (2m) Such **rotations** caused by the process of sliding can be very simply **explained** as follows.
- (2n) Balls located between two (adjacent) boards **roll** as soon as the boards **slide** over each other.
- (2o) The same is known from **hydrodynamics**:  
 Neighboring fluid layers of different velocity  $v$  cause (**physical**) **rotation** or vorticity.<sup>16</sup>
- (2p) The **rotational** or **angular velocity**  $\omega$  of the particle groups rises the **faster** the particle layers **slide** against each other.
- (2q) The following „slid-relationship“ applies:

$$\omega = \frac{1}{2} \mathbf{curl} \mathbf{v}. \quad (1)$$

<sup>14</sup>Siegel (1991), (19), Mechanical image and reality, p. 40-41

<sup>15</sup>Meyenn (1998), (14), Die Maxwellsche Elektrodynamik, 2. Bd., p. 18

<sup>16</sup>Sommerfeld (1945), (23), §1. Fundamentalsatz der Kinematik, S. 7-8 und S. 14, Gl. (19), und S. 15, Gl. (21)



(2r) Reverse interpretation of the above rotation thesis (2k) is the basic assumption underlying this article, finally leading to following (probably so far neglected) thesis.

(2s)

**The Curl Thesis:**

Equations containing a curl operator) describe **slide processes** of a **quasi-continuum**.

### § 3. APPROXIMATED POINTS ... ?

(3a) According to Maxwell, the interdependent states of the electric and magnetic fields  $\mathbf{E}$  and  $\mathbf{H}$  for **empty** space or **vacuum**<sup>17</sup> can be represented by the equations<sup>18</sup>

$$\operatorname{div} \mathbf{E} = 0, \quad \operatorname{div} \mathbf{H} = 0, \quad (2)$$

$$\frac{1}{c} \frac{\partial \mathbf{E}}{\partial t} = - \operatorname{curl} \mathbf{H}, \quad \frac{1}{c} \frac{\partial \mathbf{H}}{\partial t} = \operatorname{curl} \mathbf{E}. \quad (3)$$

(3b) Maxwell's equations (2) and (3) result in a wave equation (5) for **electromagnetic waves**,<sup>19</sup> however, only after applying the very **strange** „rot rot“-relationship (4), which is only very **rarely** explained great detail.<sup>20</sup>

$$\operatorname{curl} \operatorname{curl} \mathbf{E} = \operatorname{grad} \operatorname{div} \mathbf{E} - \nabla^2 \mathbf{E}. \quad (4)$$

<sup>17</sup>This is what physicists (after Einstein) call the space between elementary particles (with rest mass). — See also Sommerfeld (1949), (22), §6 The role of the speed of light, p. 38 below

<sup>18</sup>Meschede (2015), (13), 8.4.7 Wave equation and telegraph equation, p. 452, Eq. (8.73)

<sup>19</sup>Light waves are nothing but electromagnetic waves. — See Born (1920), (2), 9. the electromagnetic theory of light, p. 162

<sup>20</sup>**Sommerfeld** (1949), (22), §6. Die Rolle des Lichtgeschwindigkeit, S. 34 — Für die mechanische Deutung siehe **Sommerfeld** (1945), (23), §3. Drei Vektorsätze, S. 21-22

(3c) Using (4), the wave equation (5) then follows at once.<sup>21</sup>

$$\nabla^2 \mathbf{E} = \frac{1}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2}. \quad (5)$$

(3d) However, only equation (3) is actually of real interest here, because it shows:

(3e) The electromagnetic equations Maxwells contain **„curl“-operators**.

(3f) This seemingly insignificat fact (3e) is of interest because – together with of above-derived **Curl-Thesis** (2s) – it reveals a physically **highly significant** (but previously unnoticed) fact:

(3g) Maxwell’s **electromagnetic** equations describe mechanical **sliding processes** of a **quasi-continuum**.<sup>22</sup>

(3h) Because of the ubiquitous nature of electromagnetic fields, the conclusion (3g) can also be extended to the following comprehensive thesis:

(3i) **The Substance-Ether Thesis**  
The infinite **space** is a **quasi-continuum** of discrete **particles** of a material or substantial nature, which – for **historical** reasons – shall furthermore be called **ether**.

<sup>21</sup>Meschede (2015), (13), 8.4.7 Wave and telegraph equation, p. 452, Eq. (8.75)

<sup>22</sup>Ubiquitous like general 3D space.

- (3j) **Maxwell** tried to illustrate this substantial quasi-continuum (around 1860) with the **Molecular Vortex Model** shown above in **Fig. 1**.
- (3k) **Einstein** on the other hand, rejected all substantial media and taught instead:
- (3k1) All processes in our world take place in the general **space-time** continuum.<sup>23</sup>
- (3k2) The three-dimensional **space-continuum** is a **point-continuum**, since it **consists** of arbitrarily approximated **points**.<sup>24</sup>
- (3l) However, **Einstein's point-doctrine** (3k2) is highly **problematic**:
- (3m) **Points** are without (spatial) extension and therefore are **not physical objects**, but rather an absolute „**nothing**“. This is why certain physicists refer to space as **physical nothing**, meaning emptiness in accordance with the known laws of nature.<sup>25</sup>
- (3n) A pleasing aspect of the above substance-ether thesis (3i) is: It **rehabilitates** the innumerable **physicists** – it was the **overprevailing majority** of all **physicists** until about **1925** – who were firmly **convinced** of the **existence** of a medium consisting of **particles**, including celebrities such as:

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<sup>23</sup>Einstein/Infeld (1938), (4), Field and Matter / Summary, p. 234 below

<sup>24</sup>Einstein/Infeld (1938), (4), The Space-Time Continuum, p. 198 top

<sup>25</sup>Genz (2004), (9), Introduction „Nothing is real“, pp. 1-2

- (3n1) **Maxwell (1831-1879)**, the discoverer of electromagnetic waves, **lifelong to 1878**,<sup>26</sup>
- (3n2) **Schrödinger (1887-1961)**, **also in 1926**, when he found the wave equation that bears his name.<sup>27</sup>

## § 4. WORLD VIEW ISSUES

- (4a) From 1884 onwards, Hertz raised seemingly insoluble **difficulties** with the **ether** – which already had been known for some time<sup>28</sup> – in his public lectures **anew** and with all clarity.<sup>29</sup>
- (4b) It was not least the knowledge of these difficulties that led Einstein to the following **absurdly radical** simplification concerning the propagation of electromagnetic waves:
- (4c) The general (empty) **space** has the „**physical**“ **ability to transmit waves**.<sup>30</sup>
- (4d) The worldwide dissemination and general recognition of Einstein’s statement (4c) had, among other things, the consequence that **professors** presently still teach their

<sup>26</sup>Maxwell (1878), (12), Encyclopedia Britannica: **On Ether**

<sup>27</sup>Schrödinger used **explicitly** the word **ether waves** („Ätherwellen“): — See Schrödinger (1926), (18), §5. **Vergleich** der beiden Theorien, S. 755-756 — See also Zwiauer, (2020), (28), **Ether and Schrödinger’s Wave Function**, p. 188

<sup>28</sup>Born (1920), (2), Der Äther als elastischer Festkörper, pp. 100-101

<sup>29</sup>Genz (2004), (9), Lichtäther? S. 36

<sup>30</sup>Einstein/Infeld (1938), (4), Äther und Bewegung, p. 175 (unten)

**students** physical facts in books and lectures, which appear to every practitioner as **completely nonsensical**, but theoretical physicists accept **without contradiction**.

(4d1) **Light** spreads **without medium**.<sup>31</sup>

(4d2) **For light** there is **no wave medium**.<sup>32</sup>

(4e) Apart from this, Einstein's "relativistic" world view had a major influence on other branches of science. This influence was recognized as harmful from the outset and was fiercely rejected from 1920 at the latest.<sup>33</sup>

(4f) A completely different worldview was represented in these days by the idealists known (or mocked) as „**world riddle solvers**“ (German: „Welträtsellöser“), for example **Hermann Fricke**.<sup>34</sup>

(4f1) **Ether** and **spirit** are expressions of the **one world substance**.<sup>35</sup>

(4f2) The world is a **harmoniously** pre-stabilized organism – in the sense of **Leibniz, Goethe** and **Fechner**.<sup>36</sup>

(4f3) The world **ether** is **space** and **time**; it is light and gravity, electricity and magnetism. It is the empty and the full. It is heaven and earth, life and death,

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<sup>31</sup>Meschede (2015), (13), 13.5 Relativistic Doppler effect, p. 637

<sup>32</sup>Meschede (2015), (13), 4.4 Wave propagation, p. 178

<sup>33</sup>Wazeck (2005), (24), section Relativity theory and worldview

<sup>34</sup>Wazeck (2009), (25), Hermann Fricke (short biography), p. 72

<sup>35</sup>Wazeck (2009), (25), Der Äther als metaphysischer Anker, p. 181

<sup>36</sup>Wazeck (2009), (25), Der Äther als metaphysischer Anker, p. 181.

spirit and matter, nature, the world and the **connec-  
tion of all things**.<sup>37</sup>

- (4g) Due to this comprehensive conception of physics (including metaphysics) (4f), **Fricke** was „of course“ one of the **leading** German „**Einstein opponents**“,<sup>38</sup> to which renowned physics professors belonged, who were organized in international networks.<sup>39</sup>
- (4h) Even in **our** time (around 2000) there were/are Einstein-opponents. Prime example: **Stefan Marinov** († 2005).<sup>40</sup>
- (4i) But of much greater factual importance are two problem areas that remain unresolved to this day:
- (4i1) QED (Quantumelectrodynamics) – the unification of quantum theory and Einstein’s **Special** relativity theory – is based on a mathematical „**shell game**“.<sup>41</sup> Hard to believe: This „**shell-game-theory**“ became **prototype** for other modern theories!<sup>42</sup>
- (4i2) **Quantum** theory and the **general** theory of relativity are **basically incompatible**.
- (4i2a) Quantum theory is based on the invariant background of classical mechanics.<sup>43</sup>

<sup>37</sup>Wazeck (2009), (25), Der Äther als metaphysischer Anker, p. 181

<sup>38</sup>Wazeck (2009), (25), **Übersicht** über mehr als 20 bedeutsame **Einsteingegner**, p. 25

<sup>39</sup>Wazeck (2009), (25), 4.3.1 The network of Einstein opponents, pp. 293-309

<sup>40</sup>Marinov (2022), (11), Biography and Works

<sup>41</sup>Feynman (1985), (5), Einleitung/**Spielchen**, S. 17 oben, Abschliessende Bemerkungen/**Spielchen**, S. 147 unten

<sup>42</sup>Feynman (1985), (5), Einleitung/**Prototyp**, S. 19

<sup>43</sup>Smolin (2006), (21), Die fünf grossen Probleme der theoretischen Physik, S. 33

Note: By **background** „experts“ mean general **space**.

(4i2b) However, according to the **general** theory of relativity the background is **basically** variable; otherwise it could not, for example, be **curved**.<sup>44</sup>

(4i3) Because of these incompatibilities (4i(2)a) and (4i(2)b) physicists have been developing, for several decades now, a theory which is called **loop quantum gravity**. This theory says:

**Space** is a fabric of „**quantum grains**“.<sup>45</sup>

(4i4) These “loop physicists” **expressly** state something that is in perfect agreement with the **substance-ether thesis** (3i) defined above:

(4i5) The **universe** consists of grains and **is not a continuum**.<sup>46</sup>

(4i6) This view means:

The **rejection** of the **substantial ether** – by **Einstein and Born**<sup>47</sup> – was a **mistake**.

(4j) Given the above (and other) circumstances, physics professors currently teaching theoretical physics should face critical issues such as:

<sup>44</sup>Smolin (2006), (21), Die Welt der Geometrie, S. 81-82

<sup>45</sup>Rovelli (2014), (15), Einleitung / Spatziergang, S. 12

<sup>46</sup>Rovelli (2014), (15), Körnchen, S. 34

<sup>47</sup>Born (1920), (2), 15. Die Kontraktionshypothese, p. 193 including footnote 1 – see also Zwiauer, (2023), (27), Einsteins nur scheinbar unverträgliche Voraussetzung, paragraph (3i)

Can **time dilation, big bang and black holes** nowadays **still be justified?**

**With this in mind, the following should be noted:**

(4k) **Albert Einstein (1879-1955)** told his old friend Michele **Besso** in his last letter (from **1954**):

I consider it quite **possible** that physics is **not** based on the field concept, i.e. **on continuous** entities.<sup>48</sup>

(4l) Three of the **most outstanding** physicists of our time are convinced of the **existence** of an **ethermedium** and prove this in books (see below:)

(4m) **Robert B. Laughlin** (Nobel Prize in Physics **1998**),  
**Das Fabric of Spacetime.**<sup>49</sup>

(4n) **Frank Wilczek** (Nobel Prize in Physics **2004**)  
**The Grid – Persistence of Ether.**<sup>50</sup>

(4o) **Ruggero M. Santilli** (has been nominated for the Nobel Prize in **Physics** and in **Chemistry** several times)  
**The inevitability of the ether.**<sup>51</sup>

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<sup>48</sup>Fölsing (1993), (6), 5th Between Bomb and Equations, p. 824

<sup>49</sup>Laughlin (2007), (10), **The fabric of spacetime**, p. 190

<sup>50</sup>Wilczek (2008), (26), **The Grid – Persistence of Ether**, p. 73

<sup>51</sup>Santilli's ether concept. – In Gandzha and Kadeisvily (2010), (7), 5.5.3 The inevitability of the ether as a universal medium, p. 272-274



(4p) In 2010, **Ruggero Maria Santilli** groundbrakingly stated:

**THE STUDY OF THE ETHER IS THE  
ULTIMATE SCIENTIFIC FRONTIER  
OF THE THIRD MILLENNIUM.**<sup>52</sup>

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<sup>52</sup> Gandzha and Kadeisvily (2010), (7), 5. 5.3 **The inevitability of the ether as a universal medium**, p. 273 (bottom)

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