Abstract for Report
Fiber-Optic Michelson-Morley Experiment

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Abstract

In 1887, Albert A. Michelson and Edward W. Morley performed an experiment to detect the relative motion of Earth and the Luminiferous Æther. They expected to measure a speed of 30 km/s, the speed of Earth moving in its orbit. It was generally agreed that the small speeds that they measured denied the existence of an æther. As the Michelson-Morley experiments were repeated over the decades, a pattern emerged: a *vacuum* in the light path of the interferometer resulted in a *speed* of zero for the æther moving past Earth, and a slightly higher mass density (e.g. air) in the light path yielded a slightly higher *speed* of æther moving past Earth. To test if this hypothesis could be extended to larger *densities* and *speeds*, I built an interferometer with its light path formed by optical fiber with a core of glass rather than the traditional mirrors and vacuum or gas.

It turns out that the glass density is high enough to detect a range of expected speeds including the full speed of æther moving past Earth and lower speeds consistent with latitude and obliquity, etc. The experiment was a success and the hypothesis confirmed. My Michelson-Morley experiment, with proper extraneous variable values (*density, straight arm length*) succeeded, after 137 years, in measuring the speed of the motion of Earth with respect to Æther.

Contents

1
The Luminiferous Æther

Define " path" before use.

1.1 The Rise of Æther in the 19th Century

There have been competing opinions in physics during the last few hundred years over whether nature is fundamentally composed of particles in a void or waves in a medium. In the 1860s, James Clerk Maxwell unified the electric and the magnetic elements based on the experiments of Faraday and others. He also included time derivatives that led to a concise formulation of electromagnetic waves as well as static configurations.

In the 1870s, Heinrich Hertz demonstrated the wave characteristics of electromagnetism in the laboratory. Toward the end of the century, Guglielmo Marconi demonstrated the transmission and reception of electromagnetic waves around the globe.

The existence of waves requires a medium. This is well known for sound with a medium of air. Other fluids, such as water, also support sound. The characteristics of the underlying fluid, such as mass density and compressibility, could be related to characteristics of the wave, such as its speed.

(b marginpar) (margin: or em waves without a medium.)

The medium for electromagnetism was thought to be a three-dimensional elastic solid that extended throughout all space and permeated all material. The solid, rather than fluid, characteristic was used to represent polarization of electromagnetic waves. It was dubbed the Luminiferous Æther, the light bearing medium.

~~There was no connection, unfortunately, between the quantities of electromagnetic waves and the properties of æther.~~

1.2 The Downfall of Æther

The successes of the theory of electromagnetism led scientists to measure the speed of the æther moving past Earth.

~~There was no way to measure the speed of the æther directly. Since was assumed to have a fixed speed with respect to the æther, the approach taken was to measure the speed of in different directions and deduce the speed of æther from that.~~

The experiment was performed in 1887. Michelson and Morley reported that based on their experiment, the relative velocity of the earth and the æther is "probably less than one-sixth the earth's orbital velocity of 30 km/s, and certainly less than one-fourth." ... less than about 20% of the earth's velocity of 30 km/s in its orbit.

These low speeds should not rule out æther. See Directional Sensitivity below.

This speed percentage indicated that Michelson's resultant æther speed was much closer to that expected with no æther (0%) than with æther present (100%).

(Aether vs no-aether. Results reject both theories. Does Michelson ever select one?) One wonders. -sz

This result cast doubt on the current theory that the æther was static in the solar system. Given the confidence that had built up around the existence of an æther, this was a shocking development.

The following table shows the resultant speed (as a percentage of the earth's velocity) of the detected æther of the original Michelson-Morley experiment with that of two additional experiments intended to replicate the original experiment. Neither of these two experiments are strict replications of the original. Joos' experiment used a longer path, used a path in a vacuum rather than air, and used photographic data collection rather than visiual. Miller's experiment used a longer path. The original Michelson-Morley experiment has never been strictly replicated.

Experiment	Result Speed
1887, Michelson-Morley	20%
1930, Georg Joos	3%
1933, Dayton Miller	33%

Note that the Joos' speed result (3%) is nearly the same as that expected of relativity(0%). The resultant æther speed of many other Michelson-Morley experiments after 1933 were even closer to relativity than that of Joos.

Note also the large range of values of speed resulting from three experiments attempting to measure the same quantity, the speed of the æther with respect to Earth. There was no accounting for these differences.

Other MM experiments done occasionally. see See Wikipedia, MMX. Since æther theory and relativity theory are mutually exclusive, the fall of æther theory opened the door to relativity theory. This also **tipped the scale** of quantum mechanics from deterministic Schrödinger's wave mechanics to non-deterministic Heisenberg matrix mechanics.

1.3 *The Æther, revisited*

New executions of the Michelson-Miller and closely related experiments gave results progressively closer to that expected of relativity. Older tests of relativity were treated as experimental errors to be discarded and forgotten in favor of newer, better tests.

advantage of other's experiments literature review, vacuum -> SR

Two kinds of changes:

Previously unrecognized variables.

Extraneous mass density has largest effect in going from relativity to æther patterns.

Found in original reports of experiments. Air/gas to vacuum. Ostensibly to remove drafts. Unknown side effect reduced interferometer sensitivity.

All vacuum tests consistent with SR. If vacuum then agreement with SR

This suggests trying a MM with high density to **intentionally** be inconsistent with SR, and consistent with æther

Also straight arm length.

4D, 4th coordinate is W. Vacuum is reduced mass density. Larger mass density causes reduced extension of æther along W. This reduces width (perp W) of channel. This, in turn, limits rotation of path. This forces to pass through at small W, just as in 3D.

Used optical fiber.

FOG

"configuration": vacuum and small, vs density and length

simple vs optical quadrature.

~~Interferometer was funded, designed, and constructed by ZinsLab.~~

Data was like traditional but more voluminous

xxxInitial analysis

xxx30 km/x consistent

Put the following where: *difference between leading vs trailing edges. large signal, earth momentum*

1.4 *The Æther vs Spacetime*

2
The Fiber Optic MM? Interferometer

FOMM means The Fiber-Optic Michelson-Morley Interferometer (Experiment)

or is this expanded to full form

2.1 Components

(Patch Cords x2 - Fiber (5m * 6.5 +.5= 33m) — Thor SMF-28-100)

The interferometer has two arms. Each arm is five meters long, tip-to-tip. Each arm has an optical fiber of total length 32 meters. The fiber lays inside an acrylic tube. The fiber is the main sensor in the interferometer. The acrylic tube lies on a structural support. The middle of the arms are fastened perpendicular to each other and to a frame. The frame is supported from above so that when it is rotated, each arm travels in a horizontal plane.

The word *arm* can mean the entire assemblage, or just the optical fiber.

The above fiber optic arrangement is essentially the same as the traditional Michelson-Morley interferometer. The main difference is in the details of the path. In the fiber optic path, the is completely contained in the glass core of the optical fiber. In the traditional interferometer, the path was directed by mirrors and traveled through free space, either a vacuum, ambient air, a gas, etc.

Rotor Arms Body FO, Electornics Ceiling attachment Computer/Server Mechanical Electrical FO Software, Server

The most important component in the interferometer is the optical fiber.

This fiber is the fundamental sensor. The fiber is in two pieces. Each fiber is 32 m long. each piece is called an arm. The

There are two arms set perpendicular to each other DUP fiber lies in channel

Two arms are stacked with mechanical supports holding the fiber in one arm about 6.5" above the other. This is how data was originally taken. Later the support was rearranged to place the one fiber about 0.3" above the other fiber.) Each arm is horizontal; the angle between the arms is 90^0 DUP.

Mirrors on ends. Near ends connected to the fiber components which performed the interference.

mechanical, electrical, bit stream, numeric values

UMN Required, Used high counter FIBER COMPONENTS TO GRAY CODE

Optical Fiber: Thorlabs. SMF-28 Ultra with Ø900 µm Jacket, Ø125 µm Cladding

2.2 *Data Processing*

given correction, seeing 30km/s

One correction to model take input vector and calculates projection

These corrections were not applied by MM

MM assumes without statement, that 180 symmetry applies

Geometric corrections, (Dir Sens) Depending on latitude, obliquity, and times a reading of 30 km/s can be correctly plotted at from 30 km/s to 9? km/s

```
((Symmetry
    3 arrays per day. 1 for each of two 180 orientations. 1 for combination of above 2.
    Take 3 arrays, 2 at a time, 3 correlations.))

    Geometric corrections, (Dir Sens)
Depending on latitude, obliquity, and times a reading of 30 km/s can be correctly plotted at from 30 km/s

see The debug Test
Continual
  laser - preproc - arms - postproc
    photometers - counter input

Data Read (server)
  request
    counter output
    azimuth, turn counter
    timestamp
  return

Data Store (client)
```

```
  Loop
    Wait .25 seconds
    Request Data
    Save record to gDrive.
    Change file name at Midnight Mth time

Result

Data Structure

Reading:  .25-.20 Seconds, Has: timestamp, fringe shift count, azimuth.
Second:  Has 4-5 Readings
Minute, Turn:  has 60 seconds.
Half-hour:  Has 30 minutes
Day: Has 48 half-hours

A few plots show speeds of >4.5 equinox, >16solstice, <30 all;  consistent with my Speed Theory.

This explains speeds <30km/s

Presence of 4.5 thru 16 shows up in some plots. Look at more.
```

Principle: do minimum processing here, push almost everything to Analysis, which starts by read whole

medium fixed in ecliptic, plane matches ecliptic, non-rotation consistent with stars.

fiber optic flow

File format, record per reading, rows and columns, instantaneous signal,

2.3 *Directional Sensitivity of the Interferometer [Diagram Solstice]*

This could be Analysis

System and external interface (components above).

This known variable is the most overlooked ??

Sensitive: $\perp$ plane of rotation.

Direction of velocity due to Earth-Æther motion.

Effects of season, equinox vs solstice extremes. Effect of Obliquity.

Effects of latitude of interferometer.

All effects, diagrams of equinox and solstice.

Difference between 180 and 360 symmetry

specs: effects of obliquity, lat,

2.4 *Extraneous Variables[Mass Density, Length]*

I have been chasing a connection between adding mass density right and changing result speed. This table answered that.

Stage	Mass Density	Speed	Relativistic
Michelson-Morley	Low	5...7.5 km/s	Yes
Zins	High	...30 km/s	No

Table 2.1: Look at me. I'm in the margin.

2.5 *Preliminary Hypothesis - Claims*

Claims 2

Speed » 0 $H_1 Speed >> 0$. To Hypothesis Test, Student T test. Means are not the same. p-value is likelyhood that the mean of H1 is larger than experimental data. Show one day. So reject H_0, accept H_1

Directional Sensitivity. To argue 4.5 km/s (Equinox) or 16 km/s (Solstice) could be valid. (what) Use equ and sol. diagrams here. Use Histograms to Display this. Is this true at 6 am & pm? any time of day?

~~Semiannual pattern~~ of (Equ. , Sol.) Cannot argue that Equ./Sol. are annual temperature effects.

Claims h1

start with directional sensitivity?

magnitude Non-Zero AE speed magnitude is between 4.5 and 16 to nearly 30 km/s. if no ae, speed is zero. certainly not zero. even for an instant, hypothesis test

range Dir-Sens calculated per directional sensitivity. per season is a simplification of solstice and equinox

semiannual cycle but there are two cycles of solstice and equinox each year. rules out annual temp cycle. and other annual...

Plus and Minus Details

- Data. 1 record per .20 sec, one record in day's file
- Process: Take mean of 4-5 records on 1 second boundary
- Data. 1 record per 1 sec
- Process: Fit model to straight line plus ampl2 Cos(a + angle)

  The data and model is 30 min = 30 turns for each fit.

  FindFit by default finds a least-squares fit.
- Data: Take Mean over 30 min: speed, one dot
- Calc Mean speed over day.

- State degrees of freedom, 47=(24*2)-1
- (Build table)
- Process: calc p-values
- State the Alpha is also known as the level of significance. This represents the probability of obtaining your results due to chance.
- Process: show p-values

Hypotheses:

Alternative hypothesis: Experimental results are consistent with Earth moving at a speed of 30 km/s with respect to the æther.

Null hypothesis: The results are zero indicating that there is no æther affecting them.

—

——

æther is fixed in ecliptic (or invariable plane). It points to fixed stars.

Or rotates around the sun at some undetermined rate.

moves at constant speed with respect to æther.

interferometer rotates in a plane tangent to earth.

Hypothesis: data is consistent with model. Model is data within 30 and 16;

I have a hierarchical description of data. file/day,

3
Conclusions

Experiment	Angular	Density	Speed km/s
MM	time only	Ignored	$5-7.5$
DCM	Used Own	Ignored	$9-12$
SDZ	Used	Optical Fiber	24 mean

Table 3.1: Look at me. I'm in the margin.

———————- ———————- ———————-

Claims: MM et al Concluded that luminiferous aether did not exist.

That the observations were not consistent with the known orbital speed of the earth of 30km/s

that luminiferous aether did not affect the speed of light.

This is consistent with what we call special relativity.

That relativity was true

——————— Data for table

MM - Angular not used(except time of day). Density ignored. Speed 5-7.5 km/s. (30/6=5, 30/4=7.5).

p 341 . . . the relative velocity . . . is probably less than one sixth the earth's orbital velocity and certainly less than one fourth.

DCM - Angular(DirSens) Used own. Density ignored. Speed 9-12 km/s.

This is Observed, before dividing by K=0.05 . to get the "Calculated" value about 200 km/s .

SDZ - Angular used. Density used FO. Speed 24 km/s.

———————

Dayton C. Miller (DCM) determined the apex ampl and azim from the observed ampl and azim. (1887 p222).

It would be wrong to say that he ignored components of velocity that were not in the ecliptic plane.

It would be wrong to say he ignored what I call directional sensitivity.

It would be correct to say that he had no idea of the extraneous variables mass density and arm length.

This may have thrown off the magnitudes of his observations. Re

factor of 11.

3.2 The Hypothesis Test Applying the Decision Rule: REWRITE WITH OWN VALUES We now compare this to our significance level, which is 0.05. If the p- value is smaller or equal to the alpha level, we have enough evidence for our claim, otherwise we do not. Here, p-value = 0.000 , which is definitely smaller than = 0.05

The hypothesis test demonstrates that it would be extremely unlikely that the plotted data was created by random noise.

———————-

T Directional Sensitivity arguments

———————-

Tone: wrt mistakes. Neutral

Excuse their ill or non- behavior.

3.1 [raw data to p-value table]

Table 3.2: Caption

File Id	Mean	DoF	p-value
2020/07/01	Mean	47	p-value
2020/07/02	Mean	47	p-value
2020/07/03	Mean	47	p-value
2020/07/04	Mean	47	p-value
2020/07/05	Mean	47	p-value

```
Comparison of textbook example vs M'ca.
BUT I DID NOT CALCULATE t-value!.
    and t depends upon population mean
        can I take mean of 5 days as pop mean?

https://pressbooks.pub/basicstatistics/chapter/hypothesis-testing-1-mean-sigma-unknown/
quick find: 0000697
EXAMPLE 2: BACTERIA IN SWIMMING POOLS
t = 4.385
Google Sheets. use built-in T.DIST.RT
  test statistic we just calculated (but always entered as a positive value), and deg_freedom is the
T.DIST.RT(4.385,29). Step 2 gives us 0.0000697 for p-value
----
ApexInPlot15.nb
quick find: 0000697


epTitle-> 2020/07/01 < Summer Solstice bins={0, 50, 2},epfiles->{ZinsD20200701AR.txt},modelz->1|>,<|
epTitle-> 2020/07/02 < Summer Solstice bins={0, 50, 2},epfiles->{ZinsD20200702AR.txt},modelz->1|>,<|
epTitle-> 2020/07/03 < Summer Solstice bins={0, 50, 2},epfiles->{ZinsD20200703AR.txt},modelz->1|>,<|
```

```
epTitle-> 2020/07/04 < Summer Solstice bins={0, 50, 2},epfiles->{ZinsD20200704AR.txt},modelz->1|>,<|
epTitle-> 2020/07/05 < Summer Solstice bins={0, 50, 2},epfiles->{ZinsD20200705AR.txt},modelz->1|>}


Table
Columnns
    Daily File Id
    Mean of daily file
    Degrees of freedon
    p-value
Rows
    5 files
\alpha significance level

\begin{table}
    \centering
    \begin{tabular}{cc}
        Traditional & Zins  \\
        Unexpected & Expected \\
        Now is & The time \\
         & \\
         & \\
         & \\
         & \\
    \end{tabular}
    \caption{Caption}
    \label{tab:my_labelC}
\end{table}

}
```

3.2 *The Hypothesis Test*

Applying the Decision Rule: REWRITE WITH OWN VALUES We now compare this to our significance level, which is 0.05. If the p-value is smaller or equal to the alpha level, we have enough evidence for our claim, otherwise we do not. Here, p-value = 0.000 , which is definitely smaller than = 0.05

, which is definitely smaller than α = 0.05 , so we have enough evidence for the claim. . . but what does this mean?

Conclusion: Because our p-value of 0.000 is less than our α level of 0.05 , we reject H 0 . We have convincing evidence that the true mean price of a Big Mac in Imperial County is different that prices around the world.

—

Compare the p-value to the significance level and state the outcome of the test:

TRUE: If p-value$\leq \alpha$, reject H_0 in favor of H_1. The results of the sample data are significant. There is sufficient evidence to conclude that the null hypothesis H_0 is an incorrect belief and that the alternative hypothesis H_1 is most likely correct.

Conclusion: Because our p-value of 0.0000.000 is less than our α level of 0.050.05, we reject H_0. We have convincing evidence that the true mean price of a Big Mac in Imperial County is different that prices around the world.

—

3.3 *Histograms*

Show **histograms** of the five plots. These are predicted based on Solstice plot.

Need histogram $0 - 15 - 30 - 45 -$

4
Hyperspace Explanation of Æther Speed Results [see 1.2]

Chapter Names:
Hyperspace
TEN(10) points: Structure of UFT6 in Notion

4.1 Line Land

From notion, Physics Log, Flat Land, in Oct 16, 2023 Line Land.
Q. What is form of coordinates.
Horizontal X Y
Vertical Z

4.2 ideas

You might expect that this is an Explanation of why my experiment is not what

My Experiment – "Expected, Succeeded at last"
Traditional experiment – "Unexpected, Failed"

Traditional	Zins
Unexpected	Expected
Now is	The time

Table 4.1: Caption

4.3 Mass density

prove that mass3 makes universe thinner, show diagram. Pass it forward.

See notion: 12/03/23

4.4 How The Æther Works

How is density turned into speed?Shape along W, displacement Density, Thickness

Connection to Lorentz Contraction

The Venn Digram. v-> tilt.

What is significance of 'no detected æther? Maybe the light path gets scrambled.

Bending Limit of light path to lp , W_{lph} is gradual Limit keeps LP near W=0, ie, non- un- relativisticc

Case MM estimate 1/4 and 1/6 wrt full unrelativity, expected by Michelson.

4.5 Early content

*** Could start with uft6, 6D space, gal time, 6D medium**

*** Setting the stage, space and time**

3D space. coordinates XYZ Galilean vs relativistic time.

4D Space exists. 4D æther fills 4D space. The fourth coordinate is called W. The four dimensions are mutually perpendicular.

The 4D space is filled with a 4D elastic solid medium called æther. This elastic space follows all the same laws as a 3D elastic solid as discussed in conventional physics or engineering, except that it is 4D, not 3D.

Universe is a wave. Extent of this wave coincides with the Universe. More precisely, the universe is a central wavefront of a wave.

W coordinate. Direction of propagation of universe, which is a wave.

Assume that meter stick is moving at speed s along x. 1 m Extent of stick is aligned with X coordinate in 3D. It is in the XW plane in 4D.

channel as high density. plot thin lines, normal bunched at center, higher mass density as more bunched at center.

Lorentz Contraction.

Lorentz Contraction is known to account for null result in MM.

There is rotation which combines s, c_w to get angle. Rotation (not boost)

Method 1. The tan? of the angle of rotation gives Lorentz Contraction.

Method 2. Use symmetry to argue that both arms of interferometer are perpendicular to flow of æther.

Lorentz contraction is known to **account for null MM result**.

Mass density makes a Channel narrower, which reduces the rotation.

Full rotation gives full relativity; partial rotation gives partial relativity. the rest is non-relativistic for MM null result.

What about higher order term?

Diagonal path, path not at constant W. How does the non-constant-W path work?

Need to show mass density, high and low, Show mechanism and diagrams for mass high vs low. Show side-by-side differences.

Add **analogies**: Surface waves, surfer.
Catamaran?
Water under bridge.
Line Land
EM Potential Eq.
Schrödinger's Wave Equation.

5
Future Work

5.1 HyperTheory.

6D elastic solid with laws, Unverse as ideal, flat wavefront. Ten Points

5.1.1 MM inside pressure/vacuum chamber.

Direct test of density affecting results. pressure/vacuum chamber, mirrors on light table

5.1.2 MM.

5.2 Animated and print demonstrations of features.

aa bb

cc dd

5.3 Old debug Test

Explain why interferometer works Use higher dimension, 6D and 4D, elastic solid mediums, extensions of 3D space.

Large Daily Signals (with 180^0 symmetry.?) The Large component is 1000 times larger in magnitude than the. The period is one solar day vs the period of the interferometer rotation which is once per minute.

than the component due to the rotation of the arms of the interferometer ...describe arm pattern then specifics

The form of the measured aether speeds is consistent with the vector momentum potential field around Earth

Investigate: Observed patterns differ. at the leading vs trailing hemispheres of Earth One conceivable explanation is that in the passage

of aether through the Earth, it experiences turbulence in Earth's core. This could tie into the current studies of Earth's core.

Replications Build and run more accurate interferometers while observing Size and Density conditions. Upgrade fiber optic interferometer. Upgrade photometer-to-electronics decoding.

Quantify Conjectures Use arms of different lengths. Use greater variety of path densities. Consider hollow core fiber

Test with more arms to check for velocity components outside of interferometer plane.

Parallel test of identical apparatus to distinguish between instrumentation and æther noise.

Analyse other observed signals without 180^o symmetry. Study 180^o Fit models with Cos[(2 deg). Could use 180^o and 360^o (current) at the same time in Fit. Keeping track of results would be more complex.

Mach-Zender configuration. Consider replacing Michelson configuration.

Eliminate data collection interruptions due to power line and communication glitches.

5.4 Options for title of this Report

A new (version) variant of an old experiment refutes relativity. only in new CASE

Michelson and Morley's experiment finally works.
A novel configuration of an old experiment refutes relativity.
New configuration of old experiment refutes relativity.
Experiment Denies Relativity
An Experiment Denies Refutes Relativity

A partial refutation of relativity.
An Experiment Has Denied Relativity
A Non-relativistic Experiment
Experiment: Relativity is conditional, not universal.
I cracked relativity.
Experiment Cracks Relativity
Relativity is not always right.
Experiment displays a crack in relativity.
Experiment proves that relativity is conditional, not universal.
Experiment: Relativity is conditional, not universal.

Wave-Particle Duality Resolved by Experiment
Wave-Particle Paradox Resolved by Experiment
Experiment: Relativity Doesn't Always Hold
Relativity Doesn't Hold in This Experiment
Experiment uncovers a condition/case where relativity fails.

• An experiment displays an unanticipated condition where relativity fails.

≫ experiment displays a surprising condition where relativity fails.
An experiment shows that relativity is conditional, not universal.
A novel experimental configuration yields non-relativistic result.

6
Miscellany

Items at the top of this section are next to be moved up.
Items at the bottom are next to trash.

6.1 TEN(10) points: Structure of UFT6

Points 1-3: [1]

1 *Axiom*: 6D euclidean space plus time (domain) - (not 4D relativistic)

2 *Axiom*: Elastic solid medium fills space

3 *Thms: Waves supported, wave fronts,*

Points 4-5:

4 *Define*: Cosmic wave exists. Geometrical-kinematic description. - (Figure:)cylindrical element, helical lines showing torsion - Explicit UVW coordinates with - Also wave and medium formulae linear, angular velocity - our W frame only

5 ***Thm***: Cosmic wave has wavefront(s) with torsion, - implicit in formulae/geometric description - need taylor term have maximum torsion

Points 6-7:

6 ***Define***: Universe is a wave front of Cosmic wave! - Coordinates UVWXYZ - *Thms*: characteristics of universe - [following as alternatives including relativity]?

- Points 8-9: [4] - Conventional quantities in terms of characteristics of CW and of universe.

7 *(Corr)Definitions*

- Newton, Maxwell, Schroedinger - 8 *Theorems*: Laws of Newton, Maxwell, Schrödinger. Relativity

- 9 Special Relativity

- 10 Claim: UFT6 is a unified field theory.

- [more?] - Quasicrystals - old: One page description of UFT6

6.2 *Acknowledgements*

Pat Desimio - EAGER
Steven Kanim
Mark Leisher - Raspberry Pi
David Ostby
James Rice

6.3 *4D Geometry 2*

Wikipedia, Michelson–Morley experiment Light path analysis and consequences, Observer resting in the aether				
x	3D longitudinal	3D transverse	4D longitudinal	4D transverse
T_0	T_l	T_t	T_l	T_t
Aland Islands	AX	ALA	248	44
first formula	AL	ALB	008	44
third formula	DZ	DZA	012	44
American Samoa	AS	ASM	016	44
Andorra	AD	AND	020	44
Angola	AO	AGO	024	44

3D Equation

$T_t = \frac{2L}{\sqrt{c^2 - v^2}}$

4D Equation

6.4 *4D Geometry 1*

3D Equation

$$T_t = \frac{2L}{\sqrt{c^2 - v^2}} \tag{6.1}$$

4D Equation

$$T_t = \frac{2L}{\sqrt{({c_w}^2 + c^2) - v^2}} \tag{6.2}$$

Where

v is velocity of Earth wrt æther, 30 km/s.

$c = 3 \times 10^5$ km/s.

If ρ_4 is high, i.e. high mass density, then c_w is low to zero.

same as Wp formula.

and current standard calculation for MM.

even though it is never consistent with experiment.

If ρ_4 is low, then c_w is high.

If ρ_4 is curated, then c_w is special.

Compare this to DCM results of 10 km/s

Start with histograms of data days and of model

Main Points

This accounts for the differences between the old 1887 formula of MM and the data.

6.5 *Changes 1*

Important points aaaa

Hypothesis Test - identify and clean up pieces

Consolidate all speed arguments

directional sensitivity

significance of 4.5 km/s; MM conclusion wrong

in Future Work place replication hints.

Exact replication - get extraneous variables right

Extended: synced interferometers etc

1.2 The Downfall of Æther remove Experiment | Result Speed table —- Hypothesis Test

6.6 *Contradictions, questions*

Review detail MM gets 1/4 & 1/6 This seems too large for density = air.

But maybe this is the definition of too small or **too large**.

Erroneously convert average zero to non-zero. SK

6.7 *From 1.7*

———- density ———-

• Extrapolate small density effects to large

(I suspected)(It is a small step) that if the mass density in the light path was greater than that of air, there would be speeds greater than seen for air.

show the presence of æther as larger æther speeds. This was the original goal of the Michelson Morley experiment in 1887.

It-was-as-if the mass density was an independent variable acting as a sensitivity that had not been previously suspected.

fommx

decision, run, conclusions
So I decided to build such a Fiber Optic Interferometer.
And the experimental results confirmed my suspicion
———- end density ———-
•explain geometric adjustment
•critique MM
•Critique fommx
———- ———-
———

• However, there are two mechanisms that could account for the low speeds but were not considered by MM

The first is based on the fact that their interferometer could only fully detect motion in its plane of rotation.

When the ether travels at an angle to the plane of rotation, only a fraction of the 30km/s is detected. This meant that speeds down to 16 km/s could be valid... This means that given the dates of July 8-12, about 20 days after the summer solstice of 21 June, a range of speeds from 30km/s to 16 km/s NG

The second was an extraneous independent of mass density

———
define light path somewhere
mention reduction of speed due to geometry
build, run FO I
my results
———
———

• MM1887 was not failed experiment, it was misinterpreted, incompletely analysed;

after adjustment, results are consistent with æther static in solar system

———

• This led me to build an interferometer to with a higher mass density in the light path.

———-

• identify apparatus as MM

are from angular sensitivity and extraneous mass density
• explain light bouncing as def of lightpath

««MM publish, "too slow" • 1887 experiment failed, results too small, expectation was larger.

• two mistakes made, both reduced speed
• directional sensitivity has conventional mechanism

• extraneous variable *mass density* has hyper-dimensional mechanism

2020 experiment succeeded, results same as before but consistent with analysis, failure was ignoring geometry

• good enough to squelch aether then good enough to reinstate
• foundational
• mechanism, physics community quit trying, eg wave-particle duality most egregious.

MM finds speed way too small two mechanisms slow medium MM conclusion too small, my conclusion no contradiction

———————-

Around 1900, the original 1887 (dont smash these two dates) Michelson-Morley experiment was expected to show that there was an æther present that was affecting the results.

However, the observed result led to the opposite conclusion, that there was *no aether present*.

Define for Report:mirrors:light path: 3d cylinder length 3,

Define for Report:if FO:light path: 3d cylinder, length 5 m, transparent core, .001 mm.

The result suggested that a **light path*** ** with a vacuum leads to a relativistic result while a non-vacuum light path gave a non-relativistic result. **Clumsy. Multiple terms for same thing?**

Based on this minimal evidence, I conjectured that mass density was an independent variable and that a relatively high mass density would produce the expected (**non**-relativistic) result that failed to appear on the original 1887 experiment.

High density ... increased the sensitivity... made the sensor more sensitive. See Hyperspace Chapter. In order to get the desired result I chose to use optical fiber for the light path in the arms of the interferometer.

After designing, constructing and running the experiment, I ~~achieved~~ the results originally expected in 1887, that it showed the presence of æther.

My 2020 MM experiment used optical fiber with glass core. The result was consistent with an æther and inconsistent with relativity.

extraneous density and length Justified

opens door to my uft6

NO *marginpar IN FINAL DOC*

.

.

Key points:
find Earth speed wrt æther
..**Surprisingly**, no æther
light path def
extraneous, density
original motivation, find speed;
(implied or explicit) before,1887,later

Sequence:
<1760
find Earth speed wrt æther
..**Surprisingly**, no æther
light path def
extraneous, density
original motivation, find speed;
(implied or explicit) before,1887,later

previous **********

The present experiment is a variant of the Michelson-Morely experiment, originally performed in 1887.

That experiment was designed to detect the velocity of the Earth moving through a presumed medium called the *æther*.

An observed velocity of the æther of zero indicated that there was no æther present that had an effect on results.

The result of that original experiment was near zero, indicating that there was no medium present.

That experiment refutes special relativity under the given conditions. ~~Conditions consist of the values of the mass density of and the straight arm length of the light paths within the interferometer. The condition which refutes relativity is high mass density ($2.5 g/cm^3$) and long straight arm length (5m).~~

~~If the condition has high mass density and long straight arm length (5m)~~

—-

The present experiment is a variant of the Michelson-Morely experiment, originally performed in 1887. That experiment was designed to detect the velocity of the Earth moving through a presumed medium called the æther. An observed velocity of the æther of zero indicated that there was no æther present that had an effect on results. The result of that original experiment was near zero, indicating that there was no medium present.

~~The "**certain conditions**" are also extraneous variables~~

*There are **two (unrecognized extraneous variables)** in the Michelson-Morley experiment. *One variable is the *mass density in the light path, and the other is the *length of the light path.* If the *mass density is high and the path length is *long, as it is in this experiment, then relativity does not hold. Otherwise, relativity holds.

Previous experiments of this type all had conditions for agreement with relativity. That is why all previous experiments followed relativity while this one did not.

The effects of the two extraneous variables, the mass density and length of the path, are explained in terms of **six spatial dimensions**, including our familiar three, plus Galilean time plus a pervasive elastic solid æther.

However, the six spatial dimensions, etc., explain much more, from Schrödinger's Wave Mechanics to dark matter, and ultimately, the nature of the Universe, itself.

6.8 Reorg

Sequence declaration of massdensity

—

How about threads like“speed”.

Lots of speeds, percentages in early.

Comparison of others’ experiments. Rejection of M&M. Own results.

Early: temporal.

Data collection, handling

Items, errors, rejection by MandM.

Report

Make list of errors.

omission of considering directional sensitivity in rejecting the ether by Michelson or Morley.

Omission of mass density in pass in favor of eliminating drafts.

The 4.5 cut off remains an interesting and valuable feature. This gives weight to directional symmetry.

Word and page limits

Words max 10,000 - 20.000

1 page 500 words 10 pages 5,000 words 20 pages 10000 words

arXiv allows 1920 ”characters” in Abstract. It does not state LaTeX or PDF, nor blanks or not.

6.9 Editing

Backslash: "/".
Braces: "( )"
/textcolorred
~~StrikeOut~~ /sout(StrikeOut)
"probably less **than** one sixth and certainly less than one-fourth that value."

6.10 Before Index

Index

after index
PValue.nb
In[2]:=
StudentTPValue[24.457639888694754‘, 47]
StudentTPValue[24.54349799644415‘ , 47]
StudentTPValue[24.2837756879027‘ , 47]
StudentTPValue[24.766055461653394‘ , 47]
StudentTPValue[27.265326182094302‘, 47]
Out[2]= OneSidedPValue -> $1.10954 * 10^{-}28$
Out[3]= OneSidedPValue -> $9.52138 * 10^{-}29$
Out[4]= OneSidedPValue -> $1.51461 * 10^{-}28$
Out[5]= OneSidedPValue -> $6.41797 * 10^{-}29$
Out[6]= OneSidedPValue -> $9.33743 * 10^{-}31$
ASD