SECTION 9

Quantifying the Deflection

The manner of the deflection of the *Propagated Outward Flow* is curving of the path of rays of the flow as they pass close to atoms of the deflector with the direction to which curved depending on the relative positions of the ray and an atom and the amount of the curving depending on how close the ray passes to the atom. Because of the range of those variables and their various combinations the "deflection" is essentially a "scattering" in various amounts in various directions, all scattering being away from the perfectly vertical upward which the deflector is designed to solely deflect by virtue of its atomic spacing and slight tilt.

A two-dimensional physical example of the deflection is the diffraction pattern of light diffracted by a slit. Figure 9-1, below, presents the diffraction pattern produced by a slit that is $5.4 \cdot 10^{-6}$ *meter* wide with incoming light of wavelength $4.13 \cdot 10^{-7}$ *meter*. The peaks and valleys of the pattern, the interference pattern, are a phenomenon of the light imprint on the *flow* that carries it. <u>The envelope of the pattern is the relative amounts of the underlying *flow* carrying the light</u>.

For that reason, while the interference pattern varies according to the wavelength of the light involved, <u>the form of the envelope of that pattern is always the same</u>.

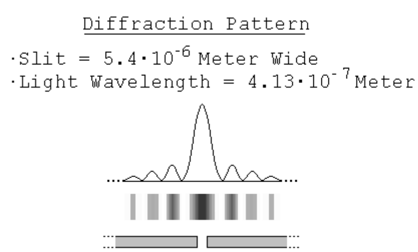

Figure 9-1
A Slit Light Diffraction Pattern

The *flow* concentration produced by the two slit edges falls off with distance from the edge inversely as the square of distance from its atoms. The Cauchy-Lorentz Distribution is an inverse square function of its variable. Its Density Function can represent the relative *flow* intensity pattern produced by the diffraction process by representing the envelope of the diffraction pattern. In Figure 9-2, below, the Cauchy-Lorentz distribution is fitted to the diffraction pattern by the appropriate choice of value of its distribution parameter γ [Greek *gamma*].

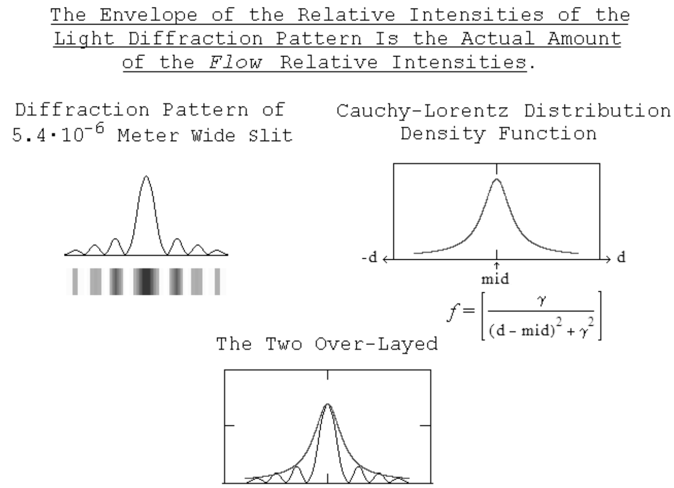

Figure 9-2
The Cauchy-Lorentz Distribution Diffraction Pattern Envelope

The deflection angle, Φ, is the angle of deflection of the rays to any particular point on the diffraction pattern. That is Φ is the angle of deflection of the rays directed to that particular point and of intensity per the Cauchy-Lorentz Distribution at that point.

The interest here is not in the location of the light interference maxima and minima, but in the deflection angles the diffraction imposes on the *flow*. However, calculation of the deflection angles to the minima provides a good indication of the amount of *flow* deflection obtained over the overall diffraction pattern. The table below presents that data for the $5.4 \cdot 10^{-6}$ *meter* wide slit with incoming light of wavelength $4.13 \cdot 10^{-7}$ *meter*. [The minimums are counted outward from the center peak of the diffraction interference pattern].

Minimum #	Φ°		Minimum #	Φ°
1	4.39		8	37.72
2	8.80		9	43.50
3	13.26		10	49.89
4	17.81		11	57.28
5	22.48		12	66.60
6	27.36		13	83.86
7	32.37		14	$Sin(\Phi) > 1.0$

$Sin(\Phi) = n \cdot [\,{}^{light\ wavelength} / {}_{slit\ width}\,],\ n = 1, 2, \ldots$
Figure 9-3 – Table of Diffraction Minimums Deflection Angles

Again, while we are not interested in the diffraction minimums and not in the diffraction interference patterns at all, the envelope of the diffraction pattern depicts the distribution of the deflection of the *flow* that carried the light in the diffraction pattern.

The above table demonstrates that the deflection of the *flow* is at least in amounts up to 90°. That deflection may well extend to angles beyond 90°, perhaps to as much as 180°, a complete reversal of direction. There is no way of determining that from the diffraction pattern, however, because the light of the diffraction pattern cannot be deflected beyond 90° in any case because the light cannot penetrate the material containing the slit.

But, the *flow* readily penetrates and permeates all of material reality.

The tilt [Figure 1-6] of the cubic crystal structure divides the slit into 10^{10} sub regions the first and last of which are at the slit's edge and produce the maximum deflection. The tilt also arranges that ultimately all of the vertical components of the incoming vertical flow must pass through one of those "at the edge of the slit" regions, must experience maximum deflection.

The overall average effect is equivalent to every ray's vertical component curving at least 90^o because the crystal tilt causes every ray to pass extremely close to an atom at some point in the crystal, as shown for the extreme rays in the figure below.

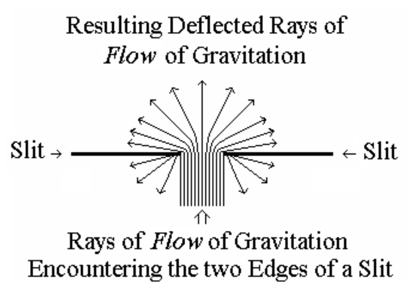

Figure 9-4 – Single Slit Gravitation Deflection

PROPAGATED OUTWARD FLOW DEFLECTION CAUSED BY WAVE SLOWING

The bending of Propagated Outward flows' paths results from differential slowing, that is the systematic slowing of the flow wave front in different amounts along that front. The slowing takes place in accordance with equation 1-1, above. Figure 9-1, below, depicts the differential slowing-caused process.

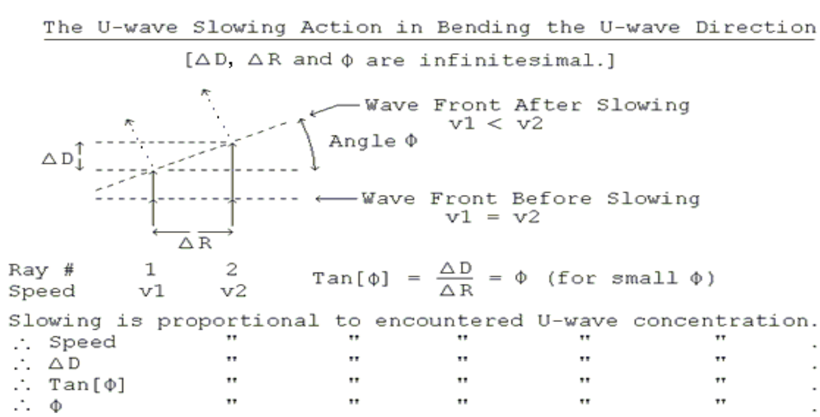

Figure 9-5 – flow Deflection

The figure indicates the differential slowing of the upward-directed [as for gravitation] flow flux that results in deflection of the flows' paths. The slowing is directly proportional to the encountered concentration of the encountered flow flux, and, therefore the angle of deflection, Φ, is proportional to that concentration.

QUANTIFYING THE FLOW DEFLECTION IN LIGHT DIFFRACTION

The diffraction pattern is a projection on a screen or piece of photographic film of the diffracted light as it spreads out due to the diffracting action. The physical size, the linear dimension of the pattern becomes larger as the distance from the diffracting slit to the screen or film on which the pattern appears increases. But the angles, as measured from the center of the slit to any point on the diffraction pattern [relative to the 0° angle from the center of the slit to the center of the pattern], are the same regardless of the distance from the slit to the screen or film.

Therefore, to analyze and evaluate the pattern requires attending to those angles, not linear distances on the pattern. Since the linear distances on the pattern are irrelevant, any convenient distance from the slit to the screen or film may be chosen. In the following analysis that distance will be taken as equal to the slit width, $5.4\cdot 10^{-6}$ *meter* in this case.

The data of interest here, which is a measure of the amount of flow bending contained in the diffraction pattern, is the portion of the total light incident on the slit appearing in any specified portion of the diffraction pattern. That portion can be defined in terms of the angles just described and that portion is an otherwise dimensionless number, again independent of the physical or linear size of the diffraction pattern.

The Cauchy-Lorentz Distribution for this application is as follows.

(9-1) The Cauchy-Lorentz Distribution Density Function

[a] In General

$$f(x;x_0,\gamma) = \frac{1}{\pi}\cdot\left[\frac{\gamma}{(x-x_0)^2+\gamma^2}\right]$$

[b] As Used Here

$$f(d;mid,\gamma) = \left[\frac{\gamma}{(d-mid)^2+\gamma^2}\right]$$

mid = half-way point between slit edges
d = distance from mid
γ = half-width at half-maximum

From the above Figure 9-2, the half-width of the Cauchy-Lorentz Distribution at its half-maximum is 74.0% of the distance from the mid-point to the first minimum in the interference pattern. That is γ is 74.0% of the displacement from the centerline to the first intensity minimum outward from the centerline. Calculating the deflection angle to that minimum[4] the angle is found to be $4.39°$.

The corresponding displacement along the d-axis [for screen distance = slit width] of the above Figure 9-3 is the value of γ in the formulation of the Cauchy-Lorentz distribution.

(9-2) γ = [74% of] [[slit width]·Tan[4.39°]]
= [0.74]·[$5.4\cdot10^{-6}$ meter]·[0.077]
= $3.1\cdot10^{-7}$ meter

The deflection angle, Φ, for any particular point on the diffraction pattern is the angle between [a] a reference line that runs from the center of the slit perpendicular to the barrier containing the slit toward the projected diffraction pattern and [b] a line running from the center of the slit to the location of the particular point on the diffraction pattern. That is the angle of deflection of the rays directed to that point and of intensity per the Cauchy-Lorentz Distribution at that point.

In these diffraction patterns so long as the ratio of the wavelength of the incident light to the width of the slit is constant, then each deflection angle, Φ, is independent of the distance from the slit to the screen where the diffraction pattern is projected.

The Cauchy-Lorentz Distribution's Cumulative Distribution Function is the integral of the Density Function, that is the area under the Density Function curve, the cumulative density. That function is given in equation *9-3*, below.

(9-3) The Cauchy-Lorentz Distribution Cumulative Distribution Function

[a] <u>In General</u>

$$f_{cum}(x;x_0,\gamma) = \frac{1}{\pi}\cdot\arctan\left[\frac{x - x_0}{\gamma}\right] + \frac{1}{2}$$

[b] <u>As Used Here</u>

$$f_{cum}(d;mid,\gamma) = \frac{1}{\pi}\cdot\arctan\left[\frac{d - mid}{\gamma}\right] + \frac{1}{2}$$

With $mid = 0$, when $d = -\infty$ [a deflection of $90°$ to the left in Figure 9-3], then $f_{cum} = 0$. Likewise at $d = +\infty$ then $f_{cum} = 1$, the total amount. To find the fraction, F, of the total amount of the incident light entering the slit that is deflected through some chosen angle, Φ, or more to the left of *mid* the procedure is as follows, taking $\Phi = -45°$ as an example and using $\gamma = 3.1\cdot10^{-7}$ meter per equation *9-2*. Because that light exists only on the flows carrying it the portion, F, is the fraction of the total amount of flows entering the slit that are deflected through angle Φ or more.

1 – Calculate the displacement, d, of Figure 9-3.

(9-4) d = Tan[Θ] × [slit width]
= Tan[-45°] × [$5.4\cdot10^{-6}$]
= $-5.4\cdot10^{-6}$ [for this example of Θ = -45°]

2 – Calculate $F = f_{cum}(d;mid,\gamma)$ from equation *9-3*.

(9-5)
$$F = f_{cum}(d;mid,\gamma) = \frac{1}{\pi}\cdot\arctan\left[\frac{d - mid}{\gamma}\right] + \frac{1}{2}$$

$$= \frac{1}{\pi}\cdot\arctan\left[\frac{(-5.4\cdot10^{-6}) - (0)}{3.1\cdot10^{-7}}\right] + \frac{1}{2}$$

$$= 0.018$$

Then P, the percentage deflected through angle Φ or more of the total flows incident on the slit is:

$F \div f_{cum}(d = +\infty) = F \div 1 = F.$

P = 1.8% of total incident light entering the slit <u>on each side</u> [for this example].

In this example calculation the portion of the total flow flux that is deflected by $\Phi = 45^\circ$ or more is $P_{45} = 1.8 + 1.8 = 3.6\%$.

Table 9-6, below, presents the portion of the total amount of the incoming gravitational flow flux that is deflected through some chosen angle, Φ or more, using the above 45° example type of calculations for each of the deflection angles cited in Table 9-3, above.

Φ°	% Deflected	Φ°	% Deflected
4.39	40.9	37.72	4.7
8.80	22.6	43.50	3.8
13.26	15.2	49.89	3.1
17.81	11.3	57.28	2.3
22.48	8.8	66.60	1.6
27.36	7.1	83.86	0.4
32.37	5.7		

Table 9-6
Percent of Total flow that is Deflected By Various Angles of Deflection, Φ, or More

USING THESE SLIT DIFFRACTION RESULTS FOR A GRAVITATION DEFLECTOR

The above table and example indicate that significant flow ray deflection does take place in the case of the atoms along the edge of the $5.4 \cdot 10^{-6}$ meter wide slit, but the amount of deflection is not very much – about only 3.6% deflected 45° or more, in the example.

On the other hand, looking at 100% of the rays of flow flux that arrive, uniformly spaced, at the $5.4 \cdot 10^{-6}$ meter wide slit, 3.6% of them arrived at that slit near enough to the atoms of one of the edges so as to be deflected 45° or more. All of the rays of that 3.6% achieved that much deflection because they passed their deflecting atom much more closely than the rest of the rays.

The 1.8% on each side of the Cauchy-Lorentz Distribution passed its deflecting atom within a distance of 1.8% of the slit width $[0.018 \times (5.4 \cdot 10^{-6}) = 9.7 \cdot 10^{-8}$ meter]. If it could be arranged that all of the vertically upward flow gravitational flux were to pass that closely to atom then 100% of the gravitational flux would be deflected by 45° or more.

However, these deflection calculations are for a flow flux of the density or concentration of the flow carrying the beam of light to the diffracting slit. The vertically upward flow flux of the Earth's gravitational field is immensely more dense or concentrated

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