New Solution to EPR (Einstein-Podolsky-Rosen) paradox and Bell's theorem using HPT and one hidden variable T.
HPT – Hoszowski Paul Theory.

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Abstract

This theory (HPT) gives a simple explanation to the observed coincidences during experiments with entangled photons obtained by using BBO. HPT works without the problematic interactions between these twin photons after the act of emission.

In HPT theory all interactions are local. Measurement outcomes are determined by features of objects present at the site of measurement.

HPT is based on the introduction of factual polarization angle T.

Value T is being determined at the moment of generation of twin photons i.e. only at the moment of reaching the state of their entanglement.

This additional parameter T is locally separately connected with each particle. This work proves that it is possible.

I. Introduction.

In this dissertation I have calculated that the commonly measured polarization of the light is an arithmetic average of the probability function T parameter for single photons.

In the following paragraphs, the commonly measured polarization of the light will be called the measurable polarization M.

Apart from polarization of the light, M also means the easily measurable angle of polarizer's (LA or LB) axis. In this case, this angle will be denoted as A or B.

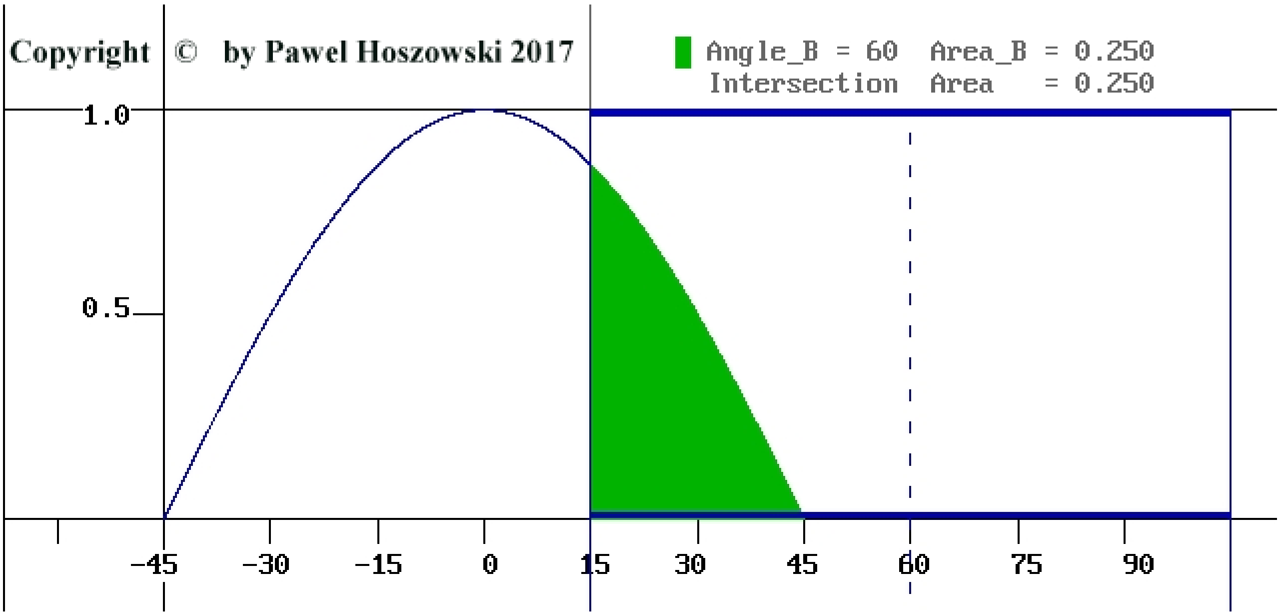
M is clearly defined only for the large population of photons, unlike the Hoszowski's factual polarization angle T , determined down to a single photon. Values of T are included from $T_{(L\_boundary)} = M - 45°$ to $T_{(R\_boundary)} = M + 45°$.

Quantum mechanics opposes the introduction of polarization M of single photon before measurement. It is because, what really exists is the Hoszowski's factual polarization angle T, which is included within [M - 45°, M + 45°].

The conclusion about the existence of the photon polarization can be drawn on the grounds of the classical wave theory of light. The easiest way to stay in accordance with it, is to assume that the population of photons have measurable polarization M, equal to direction of the polarizer's LA axis (A), for example after passing through that polarizer LA.
It is known that 100% of such photons can pass through the second polarizer LB if its axis is parallel to axis of first polarizer, LA., i.e. the angle between polarizers axis B – A = 0°.
In HPT it is shown as **overlapping** of the set of factual polarization angles T for photons (within the limit from A - 45° to A + 45°) with the factual capture angles of polarizer LB (within the limit from TB1 = B - 45° to TB2 = B + 45°).

Probability of the photon passing through successive polarizer LB is proportional to the intersection of the fields under the curve C1 and the area between the lines
x1 = TB1 = B - 45° and x2 = TB2 = B + 45°, where B is the angle of polarizer LB axis.
Curve C1 is the probability function of angle T for the photons leaving polarizer LA :
C1 = cos (2x - 2A) (1)
We consider area from cx1= $T_{(L\_boundary)}$ = A - 45° to cx2 = $T_{(R\_boundary)}$ = A + 45°,
where A is the angle of polarizer's LA axis. The whole area's value is 1. Now, let's determine the second area, picturing the abilty of capturing photons by polarizer LB. It is:
x1 = TB1 = B - 45° (2a)
x2 = TB2 = B + 45° (2b)
It is area from x1 = $TB1_{(L\_boundary)}$ = B - 45° to x2 = $TB2_{(R\_boundary)}$ = B + 45° and 'y' is included within 0 and 1. B is the 'measurable' angle of polarizer LB axis.
TB1 is the lower boundary of capture photons of factual angles T of polarizer LB.
To summarize, intersection of the fields lies under the curve C1 from x=x1 to x=cx2
<u>For example:</u> we will calculate (using HPT) how many photons will pass through polarizer LA and than polarizer LB, if A=0° and B=60°.
The field for the polarizer LB for B=60° it is the area from x1 = $T_{(L\_boundary)}$ = B - 45° = +15° to x2 = $T_{(R\_boundary)}$ = B + 45° = 105°, where B is the angle of polarizer's LB axis.
Complete field is rectricted by curve C1 with upper limit cx2 = 45°.
Practically, we consider the area from +15° to + 45° , as shown in picture 1 below:

Picture 1.



The intersection of the fields under this curve and the area between the lines x1, x2 is numerically equal to (1/4) of the whole field under the curve C1 and is numerically equal to the value of probability taken from the Malus' law for angle (B-A) = +60° (formula 3). Compare it with [6] [7] and see also table 1.

Table 1.

Angle (B – A) °	Intersection of fields	$P = \cos^2 (B - A)$ (Malus' law)
0.0	1	1
20.7	~7/8	0.875055...
30.0	6/8	0.75
37.7	~5/8	0.626034...
45.0	4/8	0.5
52.2	~3/8	0.375655...
60.0	2/8	0.25
69.3	~1/8	0.124944...
90.0	0	0

For the polarizers of determined polarization A and B the Malus' law is at work:

$I = I_o \cdot \cos^2 (B - A)$ (3)

In this formula (B - A) is the angle between the axis of the polarizer LB and LA.

I_o - is the intensity of the polarized light (M_mean = A) in front of polarizer LB,

I - is the intensity of the polarized light (M_mean = B) behind polarizer LB.

If the polarizer is lit with a stream of unpolarized light, the intensity of the passing light drops by half. Definite integral from $y = \cos^2(x)$ in range x from 0 to 2π equals π, i.e. average value of this function equals $(\pi) / (2 \cdot \pi) = 1/2$.

Since the average value of function $\cos^2$ (B-A) is 1/2, the transmission coefficient I / I_o becomes 1/2.

In order to calculate the percentage of the photons coming through the polarizer, quantum physics, just like the ”half-classic” quantum physics, **wrongly** accepts, that the polarizer is a ”drawing machine”. It is because the probability P of the photon passing through is described by the formula (4), analogically to Malus' law [7]:

$P = \gamma \cdot \cos^2 (B - A)$ (4)

where (B - A) is the angle between the axis of the polarizer LB and LA, respectively, just like in formula (3).

However, a simplified , only probabilistic approach causes a lot of further problems. In the end, one comes to the ”spooky actions at a distance” conclusion - according to Einstein's terminology.

More precisely, among others, three problems appear:

1. Immediate, paradoxical action at a distance between photons appears.
2. Experiments show that the probability of the two entangled photons passing through is a bit higher than the product of probabilities of the passing through of two not entangled photons.
3. Quantum mechanics obtains irrational paradoxes in the shape of innability to describe the polarization of particular photons.

HPT does not have the spooky features of quantum mechanics, just like HVT described in [1] [5] [8]. However, HVT gives different results to results obtained experimentally. HPT receives formula for the probability of the passing of two entangled photons: $P = \cos^2$ (B-A). This formula is in accordance with the experiments just like quantum mechanics predicted.

In Hoszowski's theory (HPT) these phenomenons can be explained with classical physics as well as conditional probability, without having to find explanation in teleportation and the transfer of signals with the speed higher than c.

Similary to Einstein, I am not going too deep into the calculus of probability.

I have assumed that the mechanism of the photon's copying behaviour should be determined i.e. there exists an additional, measurable (or predictable) physical parameter that will show which photon will or will not pass through the polarizer.
This parameter turned out to be angle T of the factual polarization angle of the single photon. For example, for photons leaving polarizer LB, probability function of T is shown by the function C2 in the given boundaries:

C2 = cos (2x - 2B) (5) - formula similar to (1)
from $x1 = TB1_{(L\_boundary)} = B - 45°$ to $x2 = TB2_{(R\_boundary)} = B + 45°$,
where B is the angle of polarizer LB axis.

II. Interpretation of HPT.

When we create a single photon, we give it a parameter T.
Whether the generated T will be alike for the succesive photons, it depends on the method of photon generation. T is not easy to measure straightforwardly.
M (equals A) is so-called measurable angle of polarizer LA, and is easy to measure.
For a specific photon generating device, arithmetic average of many angles T (calculated using the probability function T , like function C1 or C2) gives a new and unchanged angle of measurable polarization M.
That's why, on the average we receive $P = \cos^2 (B-A)$, according to the formula (4).
Quantum mechanics says that the polarization angle M hasn't got a clearly defined value before the measurement. Then, angle T , as far as I'm concerned, hasn't been interpreted in the quantum mechanics besides the tries of explanation through the Poincaré sphere.

When we create conjugated photons, for example using BBO, then these two photons have clearly defined parameter T.
Now, T1 = T2. On the other hand, polarizer defines only identical angles M **but not identical angles T.**
For BBO, photon factual polarization angles T1 and T2 can eventually be moved at a steady value, that's unchanging in given experiment.

The Hoszowski's factual polarization angle T can change from 0° to 360°, similar to the measurable polarization angle M. Hovever, to simplify the problem, we'll take on the measurable angles M from 0° to 90°, which means range of angles T

[M_L - 45°, M_R + 45°] i.e. T from –45° to +135°.

From the interpretation (using HPT) of the experiments available in the literature, we can see that angles T1 and T2 for a conjugated photons are the closer to one another, the thinner the crystal BBO. For thick crystals BBO, for example 3 mm, angles T1 and T2 start to differ. It shows a smaller amount of coincidences of photon pairs. Authors of [2] obtained following results:

"(...) we obtained a coupling efficiency of ~18% with a crystal of 3 mm length.

We achieved ~29% coupling efficiency using a 1 mm crystal and ~30% using a 0.5 mm crystal in the same experimental setup." But they did not explain this effect with the aid of aberration of angle T.

III. Explanation of HPT.

What now needs to be explained:

- How the photon factual polarization angle T (Hoszowski's angle) influences the probability of passing of the photons through successive polarizers,
- Why and how four parameters: T, M, A and B decide about probability P of passing of a two single photons through polarizers LA and then LB (and of twin photons through polarizers LA and LB).
- Why probability P becomes higher in the case for twin photons.

Let's assume, that in BBO crystal (but not in polarizer !) we've created photons of identical measured polarization M1 = M2 = D (downconversion).

In an ideal case it should be : T1 = T2 too, but not T1 = D, and not T1 = M1, and not T1 = M2 (although it can accidently happen).

Let's notice, that BBO differs from the polarizer, because it gives **two identical angles T** for the twin photons. Values T can be included within given boundaries only. But values T1 = T2 are now entangled, and cannot be scattered in relation to each other.

Now, probability of the photon passing through polarizer LA or LB (when angle A = B) is proportional to the intersection of the fields under the curve C1 (formula 6 for BBO) and the area between lines x1 = B - 45° and x2 = B + 45°, where B is the angle of polarizer's LB axis or polarizer's LA axis.

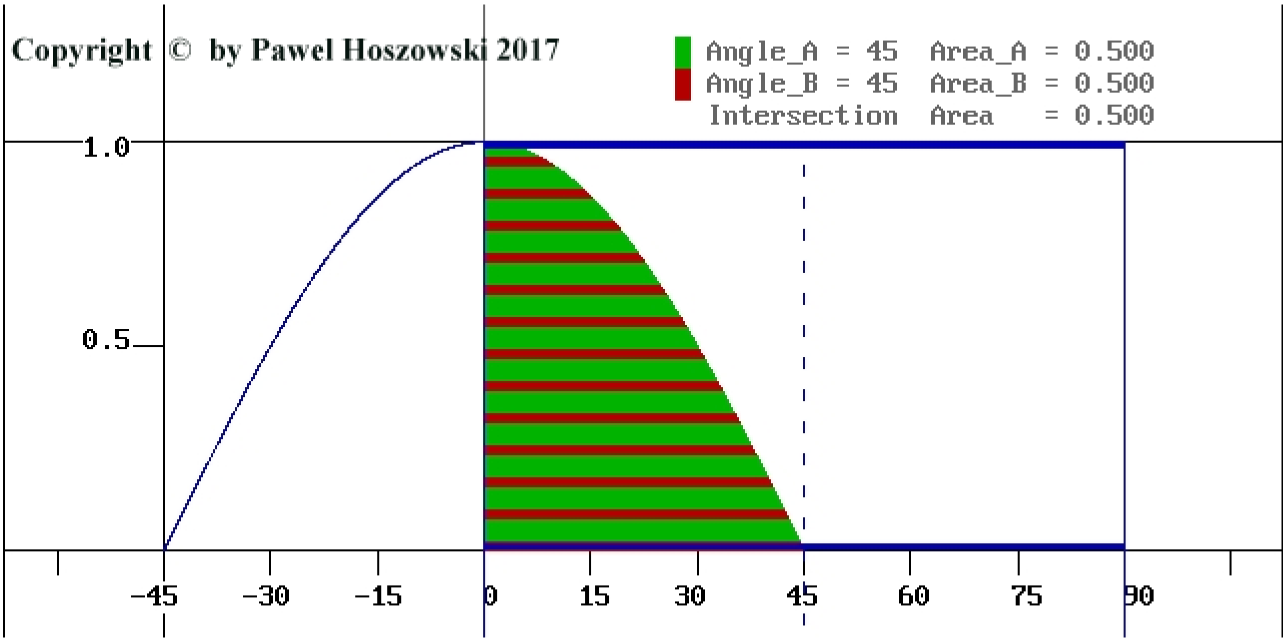
$$C1 = \cos(2x - 2D) \qquad (6)$$

where D is the measurable average angle of polarization for the photons generated in BBO.

D determines distribution of photons' T angles from T(min) = D - 45° to T(max) = D + 45°.

Exemplary drawing for A = B = 45° and D = 0°.

Picture 2.



If the generated T = T1 = T2 is included in the area between lines x1=0° and x=45°, both photons will pass through polarizer LA or LB. If T < 0° , none of the photons will pass through polarizer LA or LB (A = B), although these photons have been created in the same crystal BBO. If T > 45° and T < 90° the photons could pass through polarizer, but such photons are not produced in BBO, because T(min) = -45° to T(max) = +45°.

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Therefore, probability of coincidence for **entangled photons** is proportional to the intersection area of factual capture angles of polarizers LA, LB and to area under curve C1 of angles' T distribution by BBO. It is described below by *Hoszowski's law:*

If factual polarization angle T of two photons is identical, and if one of the photons – for example photon_1 – passed through the polarizer LA (with axis angle A), then probability of photon_2 passing through the identical polarizer LB (with axis parallel to LA, B=A) equals 1.

[**not** cos(B-A), **not** cos(T-A), and **not** cos(M-A)].

The derivation of this law will be given in a different article describing HPT theory in detail. The examples below show the usage of this law as well as explain why the probability of the passing through for entangled pair is higher than for simultaneous, but not entangled pair.

IV. Examples.

Example 1.

Not entangled photons:

Polarizer LA: A=60°: M=60°

Polarizer LB: B=60°: M=60°

Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]

$P(A) = \cos^2 (M1-A) = 0.5^2 = 1/4$

$P(B) = \cos^2 (M2-B) = 0.5^2 = 1/4$

$P = P(A) \cdot P(B) = 0.0625 = 1/16$

This means that every fourth photon generated in a single way will pass through polarizer LA, and every fourth photon generated separatelly will pass through polarizer LB. Probability of simultaneous records for simultaneous but not entangled photons on detectors A and B is $1/4 \cdot 1/4 = 1/16$.

<u>We repeat the same operations for entangled photons:</u>

Polarizer LA: A=60°: M=60°

Polarizer LB: B=60°: M=60°

Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]

$P(A) = \cos^2 (M1-A) = 0.5^2 = 1/4$

P(B) is now difficult to calculate, because photon_2 is entengled with photon_1. This means, that factual polarization angle T2 must be IDENTICAL with the factual polarization angle T1. Therefore, the behaviour of photon_2 must be identical with photon_1, because angles A and B are also the same. See picture 1.

<u>Now it is necessary to introduce conditional probability.</u>

If photon_1 didn't pass through, the factual polarization angle T1 didn't fulfill the condition for passing through polarizer LA. It applies to 3/4 of photons falling on polarizer LA.

On the other hand, if photon_1 passed through, surely its factual polarization angle T1 must have fulfilled the condition for passing through. Because angle T2 is identical with angle T1, we cannot introduce T2 and P(B) to calculate entire probability P.

According to Hoszowski's law (page 7), when T1=T2 we can say:

P'(B) = 1, or, more precisely: P(B|A) = 1

The entire probability of detection of entangled pair of photons in both detectors will be now:

$P = P(A) \cdot P'(B) = 1/4 \cdot 1 = 0.25 = 1/4$

This probability has following characteristics / features:

- it is four times higher than for simultaneous but not entangled photons (1/16)
- it is in agreement with the value found in diagram $y = \cos^2(M1\text{-}A)$ as well as with the values of corelations achieved in experiments.

P straightforwardly means the number of counts, and not a coefficient of corelations for photon_2, which equals P'(B) = 1.

Example 2.

Not entangled photons:

Polarizer LA: A=30°: M=30°

Polarizer LB: B=30°: M=30°

Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]

$P(A) = \cos^2 (M1\text{-}A) = 0.86603^2 = 3/4$

$P(B) = \cos^2 (M2\text{-}B) = 0.86603^2 = 3/4$

$P = P(A) \cdot P(B) = 0.5625 = 9/16$

This means that every three of the four photons generated in a single way will pass through polarizer LA, and every three of the four photons generated separatelly will pass through polarizer LB. Probability of simultaneous records for simultaneous but not entangled photons on detectors A and B is $3/4 \cdot 3/4 = 9/16$.

<u>We repeat the same operations for entangled photons:</u>

Polarizer LA: A=30°: M=30°

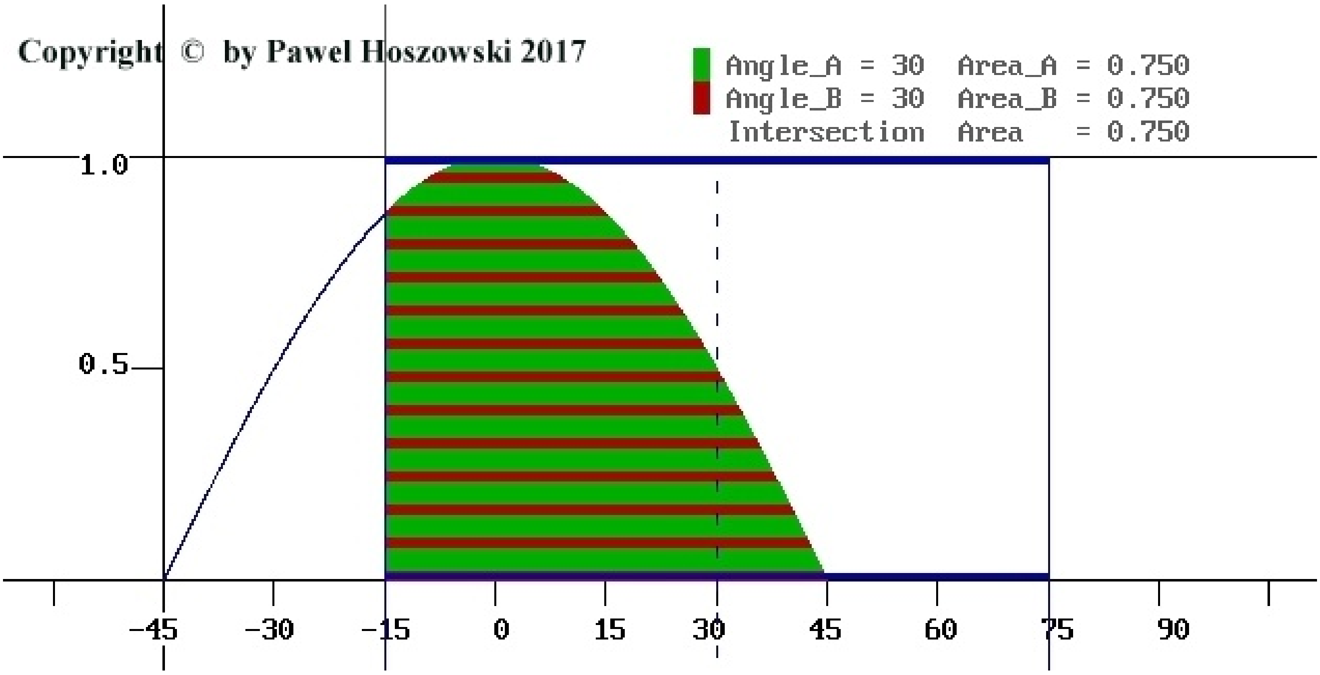
Polarizer LB: B=30°: M=30°

Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]

$P(A) = \cos^2 (M1\text{-}A) = 0.86603^2 = 3/4$

P(B) is now difficult to calculate, because photon_2 is entengled with photon_1. This means, that factual polarization angle T2 must be IDENTICAL with the factual polarization angle T1. Therefore, the behaviour of photon_2 must be identical with photon_1, because angles A and B are also the same. See picture 3.

Picture 3.



<u>Now it is necessary to introduce conditional probability.</u>

If photon_1 didn't pass through, the factual polarization angle T1 didn't fulfill the condition for passing through polarizer LA. It applies to 1/4 of photons falling on polarizer LA. On the other hand, if photon_1 passed through, surely its factual polarization angle T1 must have fullfilled the condition for passing through. Because angle T2 is identical with angle T1, we cannot introduce T2 and P(B) to calculate entire probability P. Instead we can say:

P'(B) = 1, or, more precisely: P(B | A=1) = 1

The entire probability of detection of entangled pair of photons in both detectors will be now:

$P = P(A) \cdot P'(B) = 3/4 \cdot 1 = 0.75 = 3/4$

This probability has following characteristics:

- is 33.33% higher than for simultaneous but not entangled photons (9/16)
- is in agreement with the value found in diagram $y = \cos^2(M1-A)$ as well as with the values of corelations achieved in experiments.

P straightforwardly means the number of counts, and not a coefficient of corelations for photon_2, which equals P'(B) = 1.

Example 3.

Not entangled photons:

Polarizer LA: A = +60° : M = +60°

Polarizer LB: B = +30° : M = +30°

Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]

P(A) = $\cos^2$ (M1-A) = 0.5^2 = 1/4

P(B) = $\cos^2$ (M2-B) = 0.86603^2 = 3/4

P = P(A) $\cdot$ P(B) = 0.1875 = 3/16

This means that every fourth photon generated individually will pass through polarizer LA and every three in four photons generated separatelly will pass through polarizer LB. Probability of simultaneous records for simultaneous but not entangled photons on detectors A and B is 1/4 $\cdot$ 3/4 = 3/16.

<u>We repeat the same operations for entangled photons:</u>

Polarizer LA: A = +60°: M = +60°

Polarizer LB: B = +30°: M = +30°

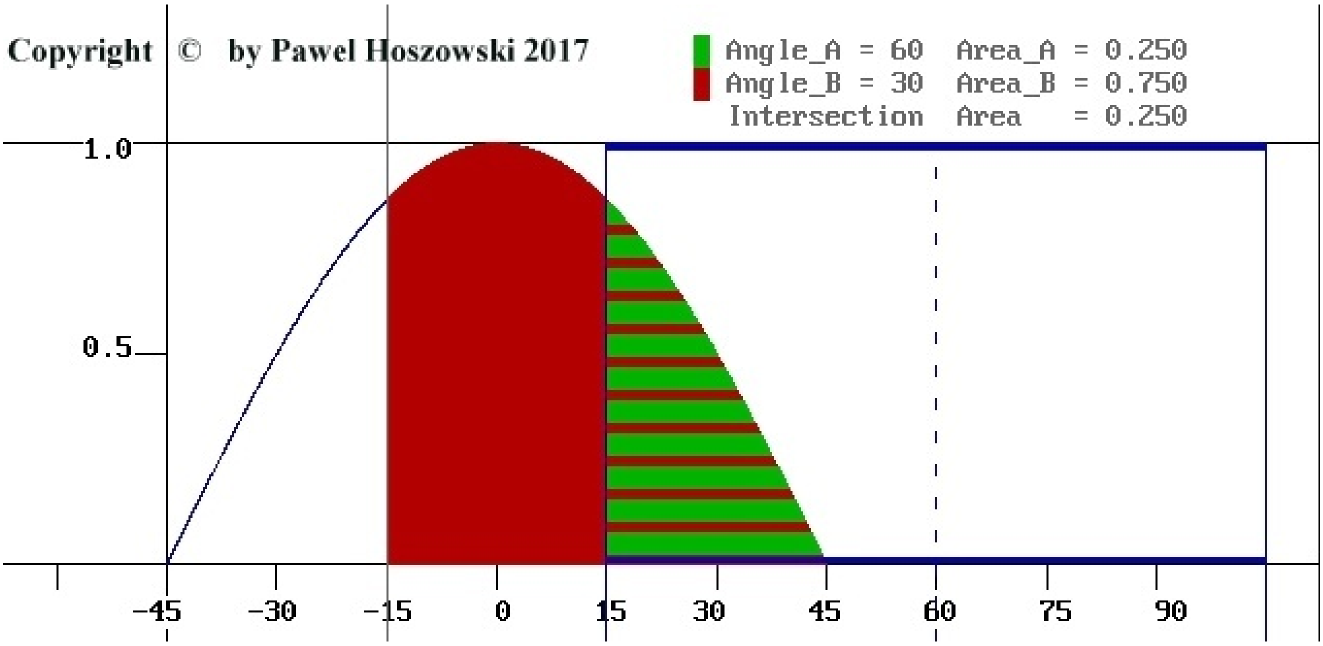
Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]

P(A) = $\cos^2$ (M1-A) = 0.5^2 = 1/4

P(B) is now difficult to calculate, because photon_2 is entengled with photon_1. This means, that factual polarization angle T2 must be IDENTICAL with the factual polarization angle T1.

Therefore, the behaviour of photon_2 must be similar to photon_1, because the area FA = 1/4 under curve y = cos(2x) from +45° to +15° is fully included in area FB = 3/4 under curve y = cos(2x) from +45° to -15°. Area FA = 1/4 depicts the photons passing through polarizer LA (A=60°, P=1/4, $x_{(L\_boundary)}$ = 60°-45° = +15°, $x_{(R\_boundary)}$ = +45°), while area FB = 3/4 depicts the photons passing through polarizer LB (B=30°, P=3/4, $x_{(L\_boundary)}$ = 30°-45° = -15°, $x_{(R\_boundary)}$ = +45°) , see picture 4 on the next page.

Picture 4.



<u>Now it is necessary to introduce conditional probability.</u>

If photon_1 didn’t pass through, the factual polarization angle T1 didn’t fullfill the condition for passing through polarizer LA. It applies to 3/4 of photons falling on polarizer LA (A=60°).

On the other hand, if photon_1 passed through [P(A)=1/4], surely its factual polarization angle T1 must have fullfilled the condition for passing through.

This, as well as picture 4 leads to conclusion that angle T1 must be included within range from +15° to +45° , so that it can fullfill the requirement for passing through polarizer LA (A=60°) and FA = 0.25.

Analogically, angle T2 must be within range from -15° to +45° (picture 4). FB = 0.75.

As we can see, all angles T1 are included in set of angles T2.

Therefore, we cannot introduce straightforwardly T2 and P(B) to calculate entire probability P.

Instead, we can say: P'(B) = 1, or, more precisely: P(B | A) = 1.

Because T1 = T2, all photons with T1 which enables passing through polarizer LA (A=60°) must also come through polarizer LB (B=30°). Just the way it is described by HPT.

It will be explained in detail in a separate article dedicated to HPT.

The entire probability of detection of entangled photons in both detectors will be now:

$P = P(A) \cdot P'(B) = 1/4 \cdot 1 = 0.25$

This probability has following characteristics:

- is 33.33% higher than for simultaneous but not entangled photons (3/16)
- is in agreement with the value found in diagram $y = \cos^2(M1-A)$ as well as with the values of corelations achieved in experiments.
- P straightforwardly means the number of counts, and not a coefficient of corelations for photon_2, which equals P'(B) = 1.

Reverse reasoning leads to the same result:

If photon_2 pass through LB, it means that it had suitable angle T2.
The probability of passing through the polarizer LA at angle A=60°
is 3 times lower than at angle B=30° (0.25 / 0.75 = 1/3).
So, if photon_2 passed through polarizer LB (B=30°) it indicates that
it is three times less probable that photon_1 passes through polarizer LA (A=60°).
So the conditional probability P'(A) = P(A|B) = 1/3, and what we get is:
$P = P'(A) \cdot P(B) = 1/3 \cdot 3/4 = 1/4$
We have achieved the same result as with reverse order of photons.

Example 4.

Not entangled, but synchronous photons:
Polarizer LA: A = +30°: M = +30°
Polarizer LB: B = +15°: M = +15°
Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]
$P(A) = \cos^2 (M1-A) = 0.86603^2 = 3/4$
$P(B) = \cos^2 (M2-B) = 0.96593^2 = 0.93301$
$P = P(A) \cdot P(B) = 0.75 \cdot 0.93301 = 0.6998$
This means that the probability of simultaneous records for simultaneous but not entangled photons on detectors A and B is 0.6998.

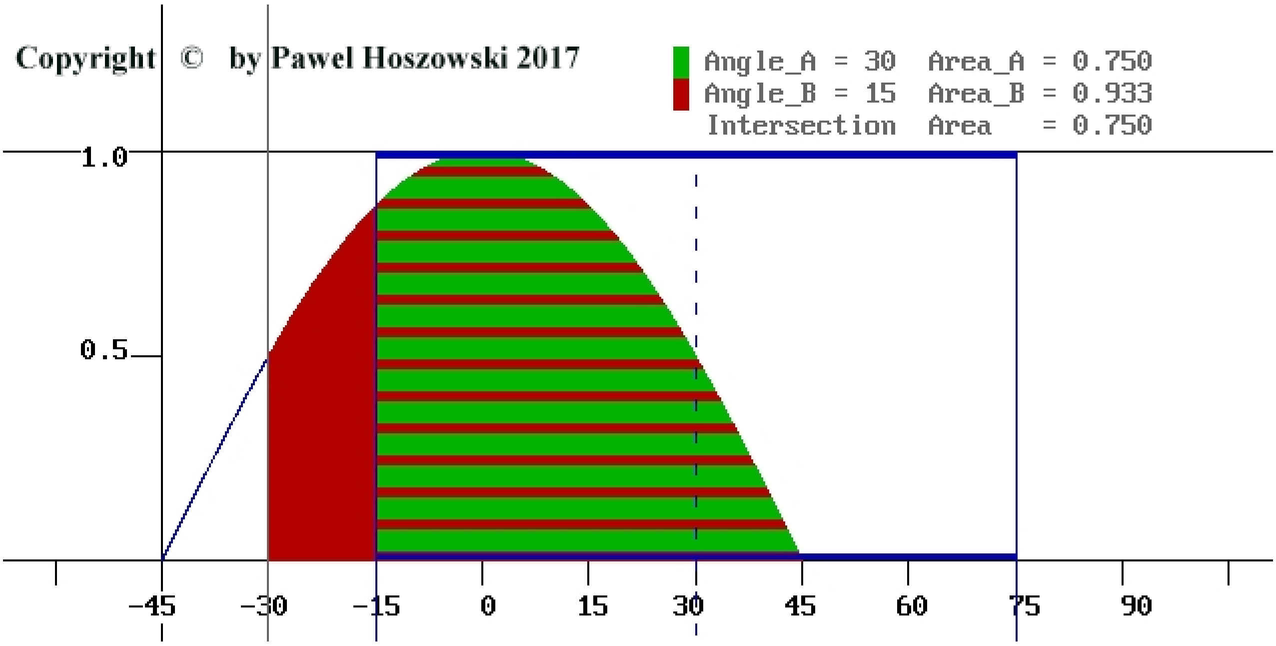
<u>We repeat the same operations for entangled photons:</u>
Polarizer LA: A = +30°: M = +30°
Polarizer LB: B = +15°: M = +15°
Exemplary parameters of two photons: M1=0° : T1 $\in$ [-45°,+45°] : M2=0° : T2 $\in$ [-45°,+45°]
$P(A) = \cos^2 (M1-A) = 0.86603^2 = 3/4$

P(B) is now difficult to calculate, because photon_2 is entengled with photon_1. This means, that factual polarization angle T2 must be IDENTICAL with the factual polarization angle T1. The behaviour of photon_1 must be similar to photon_2, because the area FA = 0.75 under curve y = cos(2x) from +45° to -15° (for photon_1) is fully included in area FB = 0.93301 under curve y = cos(2x) from +45° to -30° (for photon_2).

Area FA depicts the photons passing through polarizer LA (A=30°, P=3/4, $x_{(L\_boundary)}$ = 30°-45° = -15°, $x_{(R\_boundary)}$ = +45°), while area FB depicts the photons passing through polarizer LB (B=15°, P=0.93301, $x_{(L\_boundary)}$ = 15°-45°= -30°, $x_{(R\_boundary)}$ = +45°), see picture 5.

According to HPT, x1= -30° and x2=+60° are boundary angles for photon transmittance for polarizer LB now turned at Measurable_B = B = +15°.

Picture 5.



Now it is necessary to introduce conditional probability.

If photon_1 didn't pass through, the factual polarization angle T1 didn't fulfill the condition for passing through polarizer LA. It applies to 1/4 of photons falling on polarizer LA (A=30°). On the other hand, if photon_1 passed through, surely its factual polarization angle T1 must have fulfilled the condition for passing through.

This, as well as picture 5 leads to conclusion that angle T1 must be included within range from -15° to +45° so that it can meet the requirement for passing through polarizer LA.

Analogically, angle T2 must be within range from -30° to +45° (picture 5).
As we can see, all angles T1 are included in set of angles T2.
Therefore, we cannot introduce straightforwardly T2 and P(B) to calculate entire probability P. Instead, we can say: P'(B) = 1, or, more precisely: P(B | A) = 1.

All photons with T1 which enables passing through polarizer LA (A=30°)
must also come through polarizer LB (B=15°). Just the way it is described by HPT.
It will be explained in detail in a separate article dedicated to HPT.
The entire probability of detection of entangled photons in both detectors will be now:
$P = P(A) \cdot P'(B) = 3/4 \cdot 1 = 0.75$
This probability has following characteristics:

- is 7.17% higher than for simultaneous but not entangled photons (0.6998)
- is in agreement with the value found in diagram $y = \cos^2(B-A)$ as well as with the values of corelations achieved in experiments.

P straightforwardly means the number of counts, and not a coefficient of corelations for photon_2. This coefficient is equals P'(B) = 1.

Reverse reasoning leads to the same result:
If photon_2 pass through LB, it means that it had suitable angle T2.
The probability of passing through the polarizer LA at angle A=30°
is 1.24402 times lower than at angle B=15° (0.93301 / 0.75), P(B)=0.93301 and P(A)=0.75.
So, if photon_2 passed through polarizer LB (B=15°) it indicates that
it is 1.24402 times less probable that photon_1 passes through polarizer LA (A=30°). So the conditional probability P'(A) = P(A | B) = 1/1.24402 = 0.80385, and what we get is:
$P = P'(A) \cdot P(B) = 0.80385 \cdot 0.93301 = 0.75$
We have achieved the same result as with reverse order of photons.

V. Conclusion.

Entangled photons do not trasmit any information to each other.

VI. Suggestions.

Errors or inaccuracies committed in experiments with the examination of correlations between entangled photons will be explained in future articles on:

- Dependence of the number of correlations of twin photons on incoming polarization light falling on crystal BBO.
- Structures of HPT. Differences between HPT and HVT-EPR.

What needs to be explained among others:

1. How changing of initial polarization T (**or known M**) of photons obtained on BBO will decide the number of coincidences with identically positioned polarizers.
2. In particular, polarization of incoming light falling on crystal BBO has to be different from +45°.
3. Whether changing of the distance between polarizer and detector (within 0.1 to 1 wave lenght range) will affect the results for not entangled or entangled photons.

If this occured, it would mean that angle T is rotating during the movement of the photon. There are works which show that changing of optical paths' lenght strongly affect the coincidency of entangled photons, for example [3] [4].

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