```
In[30]:=  (* Michel Fodje's Minkwe simulation
           translated from Python to Mathematica by John Reed
           13 Nov 2013 *)

In[31]:=  (* Set run time parameters, initialize arrays *)

In[32]:=  spin = 1 / 2;
          phase = 2 π spin;
          spin2 = 2 spin;
          trials = 8000;

In[36]:=  aliceDeg = ConstantArray[0, trials];
          bobDeg = ConstantArray[0, trials];
          aliceDet = ConstantArray[0, trials];
          bobDet = ConstantArray[0, trials];


In[40]:=  nPP = ConstantArray[0, 361];
          nNN = ConstantArray[0, 361];
          nPN = ConstantArray[0, 361];
          nNP = ConstantArray[0, 361];
          nA = ConstantArray[0, 361];
          nB = ConstantArray[0, 361];

In[46]:=  (* Detector test function *)

In[47]:=  test[angle_, e_, λ_] := Module[{c, out},
             c = -Cos[1 (angle - e)];
             If[λ ≥ Abs[c], out = 0, out = Sign[c]];
             out]

In[48]:=  (* Generate particle data  *)
```

```
In[49]:= Do[
        eVector = RandomReal[{0, 2 π}];
        λ = 1 / 2 Sin[RandomReal[{0, π / 2}]]^2;
        eLeft = RandomReal[{0, 2 π}];
        eRight = eLeft + π;
        aliceAngle = RandomReal[{0, 2 π}];
        aliceDeg[[i]] = aliceAngle / Degree;
        bobAngle = RandomReal[{0, 2 π}];
        bobDeg[[i]] = bobAngle / Degree;
        aliceDet[[i]] = test[aliceAngle, eLeft, λ];
        bobDet[[i]] = test[bobAngle, eRight, λ],
        {i, trials}]
```

```
In[50]:= (* statistical analysis of particle data θ=Ceiling[Abs[(aliceDeg[[i]]-bobDeg[[i]])]]; *)
```

```
In[51]:= Do[
        θ = Ceiling[(aliceDeg[[i]] - bobDeg[[i]])];
        aliceD = aliceDet[[i]]; bobD = bobDet[[i]];
        If[aliceD == 1, nA[[θ]]++];
        If[bobD == 1, nB[[θ]]++];
        If[aliceD == 1 && bobD == 1, nPP[[θ]]++];
        If[aliceD == 1 && bobD == -1, nPN[[θ]]++];
        If[aliceD == -1 && bobD == 1, nNP[[θ]]++];
        If[aliceD == -1 && bobD == -1, nNN[[θ]]++],
        {i, trials}]
```

```
In[52]:= (* Calculate mean values and plot *)
```

```
In[53]:= pPP = 0; pPN = 0; pNP = 0; pNN = 0;
```

```
In[54]:= mean = ConstantArray[0, 361];
```

```
In[55]:= Do[
   sum = nPP[[i]] + nPN[[i]] + nNP[[i]] + nNN[[i]];
  If[sum == 0, Goto[jump],
    {pPP = nPP[[i]] / sum;
     pNP = nNP[[i]] / sum;
     pPN = nPN[[i]] / sum;
     pNN = nNN[[i]] / sum;
  mean[[i]] = pPP + pNN - pPN - pNP}];
   Label[jump],
   {i, 361}]

  (*nPP
   nNP
   nPN
   nNN*)
  aliceDet
  bobDet
```

A very large output was generated. Here is a sample of it:

```
{1, 1, 0, 1, -1, 1, -1, 1, 1, -1, -1, -1, 0, -1, 1, -1, -1, 1, 1, 0, -1, 0, -1, 1, 1, 1, -1, 1, 1, -1, 1, 0, 1, -1, 1, 1,
 1, 0, 1, 1, -1, 1, -1, 1, -1, -1, 1, 1, -1, -1, 0, 1, 1, -1, 1, 1, -1, -1, 1, -1, 0, 0, 0, 1, 1, 0, 0, 0, -1, -1, 1,
 -1, -1, 1, 1, -1, -1, 1, -1, -1, 1, 1, 1, 1, -1, -1, -1, -1, 1, -1, 1, 1, 1, -1, 1, -1, 0, 1, -1, 1, 1, -1, 0, 0,
 -1, 1, -1, 0, -1, 1, 0, 1, -1, -1, 1, 0, -1, -1, -1, -1, 1, 1, -1, 1, -1, 1, -1, 1, 1, 1, -1, -1, -1, 1, 1, 1, -1,
 -1, 1, 1, -1, 0, 0, -1, 0, -1, -1, -1, 0, 0, 1, -1, 1, 1, 1, -1, 1, -1, -1, 0, -1, 0, 1, -1, -1, 0, 0, -1, -1, -1,
 -1, 0, 1, -1, -1, -1, 0, -1, -1, 1, 1, -1, 1, -1, 1, -1, 1, -1, -1, 0, -1, 1, -1, 1, 1, 0, -1, 1, 1, 0, -1, 1, -1,
 1, 1, 1, 1, -1, 1, 1, 1, 1, -1, 1, 1, 0, -1, 1, 0, 0, -1, 1, -1, -1, 1, -1, 0, 1, -1, 1, 0, 0, 0, -1, -1, 1, 0, -1,
 -1, -1, -1, 1, 1, 0, 1, -1, 0, 1, 1, 1, 0, 1, 0, 1, «7492», -1, 0, -1, 1, 1, 1, 1, 1, -1, -1, -1, 1, 1, -1, 1, 1,
 1, 1, 1, 1, 1, -1, 0, 1, -1, 0, 0, 1, 1, 0, -1, -1, 1, 0, -1, 1, 1, 1, 0, 1, -1, -1, 1, 1, 1, 1, 1, 1, 1, 0, 0, -1,
 -1, -1, 1, 0, 0, 1, 1, 1, 0, 1, 1, -1, -1, 1, 1, -1, 0, -1, 1, 1, 0, 1, 1, -1, -1, -1, -1, -1, -1, 1, -1, -1, 1, 1,
 1, 0, 0, 1, 1, -1, 1, -1, -1, 1, -1, 1, 1, 1, 1, -1, -1, -1, 0, -1, 0, -1, 1, -1, 0, -1, 1, 1, 1, 1, -1, 1, 1, -1, 1,
 1, 1, 1, -1, -1, 1, -1, 1, -1, 0, 0, 0, 1, 1, 0, -1, -1, 1, -1, 1, -1, 0, -1, 1, -1, -1, -1, -1, 1, -1, 1, -1, -1,
 1, -1, 1, -1, -1, -1, -1, 0, -1, -1, 1, 0, 1, 1, 0, 1, 1, -1, -1, 1, -1, -1, 1, -1, -1, -1, -1, -1, 1, -1, -1, 1,
 1, -1, 1, 1, 0, 1, -1, 1, 1, -1, 0, 1, -1, 1, 1, 1, 1, 1, 1, 1, -1, -1, 1, 1, 1, -1, 0, 1, 1, 1, 0, -1, 1, 0, -1, 1,
 1, 0, 0, -1, 1, 1, 1, -1, 0, 1, -1, 1, -1, 0, -1, -1, -1, 1, 0, -1, -1, -1, 1, 1, -1, -1, -1, 1, 1, 0, -1, 1, -1}
```

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A very large output was generated. Here is a sample of it:

```
{-1, -1, 0, 0, 1, 1, 1, 1, -1, -1, 0, -1, -1, -1, 1, 0, 0, 1, -1, -1, 1, 1, -1, -1, -1, 1, 1, 0, -1, -1, -1, -1, 1, -1,
 1, 1, 0, 1, 1, -1, -1, 1, 1, -1, -1, 0, -1, 1, -1, 0, -1, 0, -1, 1, -1, -1, -1, -1, -1, 0, 1, -1, -1, -1, 0, -1,
 -1, 0, -1, -1, -1, 1, -1, 1, 1, 1, 1, -1, -1, 1, 1, -1, 1, 1, -1, -1, -1, 1, 1, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, -1,
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 1, -1, 1, -1, -1, -1, -1, -1, 1, 0, -1, 1, -1, 0, -1, -1, 0, -1, -1, -1, 1, 1, -1, 0, 1, 1, -1, 1, -1, -1, -1, 1,
 1, 1, 1, -1, 1, 0, 1, 0, -1, 1, -1, 1, 1, 0, -1, 1, -1, 1, 1, -1, -1, 0, 1, 1, 1, 1, -1, -1, 0, 1, 1, -1, -1, -1, -1,
 -1, 0, 1, 0, -1, -1, -1, -1, -1, 1, 1, 1, -1, -1, 1, -1, 1, -1, 1, 1, 1, 1, 1, 0, 0, -1, 1, -1, 1, 1, 0, 1, -1, -1,
 0, 1, 1, 1, 1, 0, -1, -1, 1, -1, 1, 1, 1, -1, -1, -1, 0, ≪7495≫, 1, 0, 1, 1, -1, 1, -1, 1, -1, 1, 1, -1, 0, -1,
 -1, -1, 1, 1, -1, -1, -1, -1, -1, 1, 1, -1, -1, 1, -1, -1, 1, 1, 0, -1, 1, 0, 0, -1, 1, -1, -1, -1, 0, -1, -1, -1,
 -1, 1, 0, -1, -1, 0, 1, 1, -1, 1, 1, 1, -1, -1, 0, 1, 1, 0, 1, -1, 1, 1, -1, 0, 0, 0, 1, 1, -1, -1, -1, -1, 0, 1,
 -1, 1, -1, 1, -1, -1, -1, -1, 1, -1, 0, -1, 1, -1, 1, 1, -1, -1, -1, 1, -1, 1, 1, 1, -1, 1, -1, 1, 1, 0, 1, 1, 1, 1,
 -1, -1, -1, 0, -1, 1, -1, 1, 0, 1, -1, 1, -1, -1, 1, 1, -1, 0, 1, -1, -1, -1, 1, 1, 1, 0, -1, 0, -1, 1, 1, -1, 1,
 1, -1, 1, -1, 1, -1, -1, -1, -1, 1, 1, 0, 1, 0, -1, 1, 1, 1, 1, 0, 1, -1, 0, -1, -1, -1, -1, 1, 0, 1, 1, 0, 1, -1,
 0, 1, -1, 0, 1, 1, -1, -1, 1, 0, 1, 1, -1, 1, 1, 1, 1, 1, 0, 1, 1, -1, 1, 1, -1, 0, 1, 0, -1, 1, -1, 1, 0, 1, -1, 1,
 0, -1, 1, -1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 1, 1, -1, -1, -1, -1, 1, 1, -1, -1, 1, 1, 0, 0, -1, 1, 1, -1, 0, 0, 1, -1}
```

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In[58]:=