```
> restart:with(linalg):
```

b3ornot.mws
R. M. Kiehn 10/25/97

This Maple program may be used to test some of the formulas utilized in the formulation of B(3) theory by Evans.

The idea is:
given a three vector **A** of complex components compute
A x **A***
then compare to
B x **B***
where **B = curl A**
and then to evaluate
curl(B x B*) = curl curl (A x A*)

Evans claims that
CLAIM 1.
A x **A* = constant** **B** x **B***
and
CLAIM 2
curl (B x B*) = curl (A x A*) = 0

Reference the Web Download
"The B(3) FIELD"
M. W. Evans (October 1994)
Eq 48,43,37,34,33,32

The first example given below indicates that these statements are not precise.

```
Warning, new definition for norm
Warning, new definition for trace
```

EXAMPLE 1

First define two functions on the domain (x,y,z)

```
> alpha:=1/(x^2+y^2+z^2);beta:=(x*y/(z*z));
```

$$\alpha := \frac{1}{x^2+y^2+z^2}$$

$$\beta := \frac{x\,y}{z^2}$$

Next construct a complex vector field propagating in the z direction: Define the real amplitude as grad(alpha) and the imaginary amplitude as grad (beta)

```
> Arealpart:=grad(alpha,[x,y,z]);
```

$$Arealpart := \left[-2\frac{x}{(x^2+y^2+z^2)^2}, -2\frac{y}{(x^2+y^2+z^2)^2}, -2\frac{z}{(x^2+y^2+z^2)^2} \right]$$

```
> Aimagpart:=I*grad(beta,[x,y,z]);
```

$$Aimagpart := I\left[\frac{y}{z^2}, \frac{x}{z^2}, -2\frac{x\,y}{z^3} \right]$$

Next construct the complex vector with a propagation phase factor expI(kz-wt)

```
> A:=evalm((Arealpart+Aimagpart)*exp(I*(k*z-omega*t)));
```

$$A := \left[\mathbf{e}^{(I\,(k\,z-\omega\,t))}\left(-2\frac{x}{(x^2+y^2+z^2)^2} + \frac{I\,y}{z^2} \right), \mathbf{e}^{(I\,(k\,z-\omega\,t))}\left(-2\frac{y}{(x^2+y^2+z^2)^2} + \frac{I\,x}{z^2} \right), \mathbf{e}^{(I\,(k\,z-\omega\,t))}\left(-2\frac{z}{(x^2+y^2+z^2)^2} - 2\frac{I\,x\,y}{z^3} \right) \right]$$

Next form the complex conjugate of the complex vector A

```
> ACC:=evalm((Arealpart-Aimagpart)*exp(-I*(k*z-omega*t)));
```

$$ACC := \left[\mathbf{e}^{(-I\,(k\,z-\omega\,t))}\left(-2\frac{x}{(x^2+y^2+z^2)^2} - \frac{I\,y}{z^2} \right), \mathbf{e}^{(-I\,(k\,z-\omega\,t))}\left(-2\frac{y}{(x^2+y^2+z^2)^2} - \frac{I\,x}{z^2} \right), \mathbf{e}^{(-I\,(k\,z-\omega\,t))}\left(-2\frac{z}{(x^2+y^2+z^2)^2} + 2\frac{I\,x\,y}{z^3} \right) \right]$$

Then compute the curls of each component and label each as B or BCC

```
> B:=curl(A,[x,y,z]);BCC:=curl(ACC,[x,y,z]);
```

$$B := \left[-I\,k\,\mathbf{e}^{(I\,(k\,z-\omega\,t))}\left(-2\frac{y}{(x^2+y^2+z^2)^2} + \frac{I\,x}{z^2} \right), I\,k\,\mathbf{e}^{(I\,(k\,z-\omega\,t))}\left(-2\frac{x}{(x^2+y^2+z^2)^2} + \frac{I\,y}{z^2} \right), 0 \right]$$

$$BCC := \left[I\,k\,\mathbf{e}^{(-I\,(k\,z-\omega\,t))}\left(-2\frac{y}{(x^2+y^2+z^2)^2} - \frac{I\,x}{z^2} \right), -I\,k\,\mathbf{e}^{(-I\,(k\,z-\omega\,t))}\left(-2\frac{x}{(x^2+y^2+z^2)^2} - \frac{I\,y}{z^2} \right), 0 \right]$$

Next
compute the cross product of A and ACC
compute the cross product of B and BCC
and finally
compute the curl of A x ACC
and the curl of B x BCC

```
> AxACC:=crossprod(A,ACC):BxBCC:=crossprod(B,BCC):curlBxBCC:=curl(Bx
BCC,[x,y,z]):MAGCURLB:=innerprod(curlBxBCC,curlBxBCC):curlAxACC:=c
url(AxACC,[x,y,z]):MAGCURLA:=innerprod(curlAxACC,curlAxACC):
```

Now display the components of the "conjugate product" defined as A^A*

```
> AxACC1:=factor(evalc(Im(AxACC[1])/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t)))));AxACC2:=factor(evalc(Im(AxACC[2])/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t)))));AxACC3:=factor(evalc(Im(AxACC[3])/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t)))));
```

$$AxACC1 := -4\,\frac{x\,(z^2+2\,y^2)}{z^3\,(x^2+y^2+z^2)^2}$$

$$AxACC2 := 4\,\frac{y\,(2\,x^2+z^2)}{z^3\,(x^2+y^2+z^2)^2}$$

$$AxACC3 := 4\,\frac{(x-y)\,(x+y)}{(x^2+y^2+z^2)^2\,z^2}$$

Compare to the components of the BxB* product

```
> BxBCC1:=factor(evalc(Im(BxBCC[1])/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t)))));BxBCC2:=factor(evalc(Im(BxBCC[2])/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t)))));BxBCC3:=factor(evalc(Im(BxBCC[3])/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t)))));
```

$$BxBCC1 := 0$$

$$BxBCC2 := 0$$

$$BxBCC3 := 4\,\frac{k^2\,(x-y)\,(x+y)}{(x^2+y^2+z^2)^2\,z^2}$$

It is apparent from the example that Evans CLAIM 1 that AxACC = constant BxBCC is false.
For this example, the claim is true for the third components only.

Next compute the curl (A x A*) and curl (B x B*) and display their components.

```
> MG:=factor(MAGCURLB/((exp(-I*(k*z-omega*t)))^2)/(exp(I*(k*z-omega*t)))^2):Magn_of_curlBxBCC:=MG;MG:=factor(MAGCURLA/((exp(-I*(k*z-omega*t)))^2)/(exp(I*(k*z-omega*t)))^2):Magn_of_curlAxACC:=MG;
```

$$Magn\_of\_curlBxBCC := -64\,\frac{(x^6+3\,x^4\,y^2-2\,x^4\,z^2+12\,x^2\,y^2\,z^2+x^2\,z^4+3\,x^2\,y^4+y^2\,z^4-2\,y^4\,z^2+y^6)\,k^4}{z^4\,(x^2+y^2+z^2)^6}$$

$$Magn\_of\_curlAxACC := -144\,\frac{4\,x^4\,y^2+4\,x^2\,y^4+8\,x^2\,y^2\,z^2+x^2\,z^4+y^2\,z^4}{z^8\,(x^2+y^2+z^2)^4}$$

For the given example field it is also evident that the curl of B x B* is not zero.
and the curl of A x A* is not zero,
and the two curls are NOT equivalent.

THE CONCLUSION IS THAT THIS COUNTER EXAMPLE DEMONSTRATES THAT THE EVANS CLAIMS ARE NOT UNIVERSAL.

Now display the magnitude of the magnetic field B, from A, A* or A + A*, the result is the same

```
> Longitudinal_Magnetic_Field:=B[3];
```

$$Longitudinal\_Magnetic\_Field := 0$$

THERE IS NO LONGITUDINAL MAGNETIC COMPONENT deducible from a curl operation on a vector potential (for the example displayed)
ACCORDING TO EVANS FORMULAS,
EVEN THOUGH THERE IS A NON-ZERO A x A*

From the vector potential it is possible to compute the electric field (from A, A* or A + A*)

```
> E:=-[diff(A[1],t),diff(A[2],t),diff(A[3],t)]:ECC:=-[diff(ACC[1],t)
,diff(ACC[2],t),diff(ACC[3],t)]:ESQ:=innerprod(E,E):BSQ:=innerprod
(B,B):POINCARE1:=factor((omega^2*BSQ-k^2*ESQ)/(exp(I*(k*z-omega*t)
)*exp(I*(k*z-omega*t))));POINCARE2:=innerprod(E,B);
```

$$POINCARE1 := -4\,\frac{k^2\,(-z^4\,x\,y-2\,x\,y^3\,z^2-x\,y^5-2\,x^3\,y\,z^2+I\,z^4-2\,x^3\,y^3-x^5\,y)^2\,\omega^2}{(x^2+y^2+z^2)^4\,z^6}$$

$$POINCARE2 := 0$$

Now form the complex Poynting vector (Stratton P.137)

```
> COMPLEXExB:=crossprod(E,BCC);
```

$$\begin{aligned}COMPLEXExB := \Bigg[& -\omega\,\%2\left(-2\,\frac{z}{(x^2+y^2+z^2)^2}-2\,\frac{I\,x\,y}{z^3}\right)k\,\%1\left(-2\,\frac{x}{(x^2+y^2+z^2)^2}-\frac{I\,y}{z^2}\right),\\
& -\omega\,\%2\left(-2\,\frac{z}{(x^2+y^2+z^2)^2}-2\,\frac{I\,x\,y}{z^3}\right)k\,\%1\left(-2\,\frac{y}{(x^2+y^2+z^2)^2}-\frac{I\,x}{z^2}\right),\\
& \omega\,\%2\left(-2\,\frac{x}{(x^2+y^2+z^2)^2}+\frac{I\,y}{z^2}\right)k\,\%1\left(-2\,\frac{x}{(x^2+y^2+z^2)^2}-\frac{I\,y}{z^2}\right)\\
& +\omega\,\%2\left(-2\,\frac{y}{(x^2+y^2+z^2)^2}+\frac{I\,x}{z^2}\right)k\,\%1\left(-2\,\frac{y}{(x^2+y^2+z^2)^2}-\frac{I\,x}{z^2}\right)\Bigg]\end{aligned}$$

$$\%1 := \mathbf{e}^{(-I\,(k\,z-\omega\,t))}$$

$$\%2 := \mathbf{e}^{(I\,(k\,z-\omega\,t))}$$

```
>
> POYExB1:=factor(COMPLEXExB[1]/((exp(-I*(k*z-omega*t))))/(exp(I*(k*
z-omega*t))));POYExB2:=factor(COMPLEXExB[2]/((exp(-I*(k*z-omega*t)
)))/(exp(I*(k*z-omega*t))));;POYExB3:=factor(COMPLEXExB[3]/((exp(-
I*(k*z-omega*t))))/(exp(I*(k*z-omega*t))));
```

$$POYExB1 := 2\,k\,(-z^4\,x\,y-2\,x\,y^3\,z^2-x\,y^5-2\,x^3\,y\,z^2+I\,z^4-2\,x^3\,y^3-x^5\,y)$$

$$(2\,I\,x\,z^2 - y\,x^4 - 2\,y^3\,x^2 - 2\,y\,x^2\,z^2 - y^5 - 2\,y^3\,z^2 - y\,z^4)\,\omega \Big/ ((x^2+y^2+z^2)^4\,z^5)$$

$$POYExB2 := 2\,k\,(-z^4\,x\,y - 2\,x\,y^3\,z^2 - x\,y^5 - 2\,x^3\,y\,z^2 + I\,z^4 - 2\,x^3\,y^3 - x^5\,y)$$
$$(2\,I\,y\,z^2 - x^5 - 2\,x^3\,y^2 - 2\,x^3\,z^2 - x\,y^4 - 2\,x\,z^2\,y^2 - x\,z^4)\,\omega \Big/ ((x^2+y^2+z^2)^4\,z^5)$$

$$POYExB3 := \omega\,k\,(x^2+y^2)\,(x^4 + 2\,z^2\,y^2 + 2\,y^2\,x^2 + 2\,z\,y^2 + 2\,x^2\,z + 2\,z^3 + 2\,x^2\,z^2 + 2\,z^2 + z^4 + y^4)$$
$$(x^4 + 2\,z^2\,y^2 + 2\,y^2\,x^2 - 2\,z\,y^2 - 2\,x^2\,z - 2\,z^3 + 2\,x^2\,z^2 + 2\,z^2 + z^4 + y^4) \Big/ ((x^2+y^2+z^2)^4\,z^4)$$

However, consider the

EXAMPLE 2

```
> alpha:=1/(x^2+y^2);beta:=(x*y);
```

$$\alpha := \frac{1}{x^2+y^2}$$

$$\beta := y\,x$$

Next construct a complex vector field propagating in the z direction: Define the real amplitude as grad(alpha) and the imaginary amplitude as grad (beta)

```
> Arealpart:=grad(alpha,[x,y,z]);
```

$$Arealpart := \left[-2\,\frac{x}{(x^2+y^2)^2},\, -2\,\frac{y}{(x^2+y^2)^2},\, 0 \right]$$

```
> Aimagpart:=I*grad(beta,[x,y,z]);
```

$$Aimagpart := I\,[y,\, x,\, 0]$$

Next construct the complex vector with a propagation phase factor

```
> A:=evalm((Arealpart+Aimagpart)*exp(I*(k*z-omega*t)));
```

$$A := \left[\mathbf{e}^{(I\,(k\,z-\omega\,t))} \left(-2\,\frac{x}{(x^2+y^2)^2} + I\,y \right),\, \mathbf{e}^{(I\,(k\,z-\omega\,t))} \left(-2\,\frac{y}{(x^2+y^2)^2} + I\,x \right),\, 0 \right]$$

Next form the complex conjugate of the complex vector A

```
> ACC:=evalm((Arealpart-Aimagpart)*exp(-I*(k*z-omega*t)));
```

$$ACC := \left[\mathbf{e}^{(-I\,(k\,z-\omega\,t))} \left(-2\,\frac{x}{(x^2+y^2)^2} - I\,y \right),\, \mathbf{e}^{(-I\,(k\,z-\omega\,t))} \left(-2\,\frac{y}{(x^2+y^2)^2} - I\,x \right),\, 0 \right]$$

Form the curls of each vector field and label as B and BCC

```
> B:=curl(A,[x,y,z]);BCC:=curl(ACC,[x,y,z]);
```

$$B := \left[-I\,k\,\mathbf{e}^{(I\,(k\,z-\omega\,t))} \left(-2\,\frac{y}{(x^2+y^2)^2} + I\,x \right),\, I\,k\,\mathbf{e}^{(I\,(k\,z-\omega\,t))} \left(-2\,\frac{x}{(x^2+y^2)^2} + I\,y \right),\, 0 \right]$$

$$BCC := \left[I\,k\,\mathbf{e}^{(-I\,(k\,z-\omega\,t))} \left(-2\,\frac{y}{(x^2+y^2)^2} - I\,x \right),\, -I\,k\,\mathbf{e}^{(-I\,(k\,z-\omega\,t))} \left(-2\,\frac{x}{(x^2+y^2)^2} - I\,y \right),\, 0 \right]$$

Next

compute the cross product of A and ACC
compute the cross product of B and BCC
compute the curl of A x ACC
compute the curl of B x BCC

```
> AxACC:=crossprod(A,ACC):BxBCC:=crossprod(B,BCC):curlBxBCC:=curl(BxBCC,[x,y,z]):MAGCURLB:=innerprod(curlBxBCC,curlBxBCC):curlAxACC:=curl(AxACC,[x,y,z]):MAGCURLA:=innerprod(curlAxACC,curlAxACC):
```

Next display the components of the "conjugate product"

```
> AxACC1:=factor(evalc(Im(AxACC[1])/((exp(-I*(k*z-omega*t)))/(exp(I*(k*z-omega*t))))));AxACC2:=factor(evalc(Im(AxACC[2])/((exp(-I*(k*z-omega*t)))/(exp(I*(k*z-omega*t))))));AxACC3:=factor(evalc(Im(AxACC[3])/((exp(-I*(k*z-omega*t)))/(exp(I*(k*z-omega*t))))));
```

$$AxACC1 := 0$$

$$AxACC2 := 0$$

$$AxACC3 := 4\,\frac{(x-y)\,(x+y)}{(x^2+y^2)^2}$$

Compare to the components of the BxB* product

```
> BxBCC1:=factor(evalc(Im(BxBCC[1])/((exp(-I*(k*z-omega*t)))/(exp(I*(k*z-omega*t))))));BxBCC2:=factor(evalc(Im(BxBCC[2])/((exp(-I*(k*z-omega*t)))/(exp(I*(k*z-omega*t))))));BxBCC3:=factor(evalc(Im(BxBCC[3])/((exp(-I*(k*z-omega*t)))/(exp(I*(k*z-omega*t))))));
```

$$BxBCC1 := 0$$

$$BxBCC2 := 0$$

$$BxBCC3 := 4\,\frac{k^2\,(x-y)\,(x+y)}{(x^2+y^2)^2}$$

It is apparent from this second example that Evans claim that AxACC = constant BxBCC is true.
The components of A x A* are proprotional to the components of B x B*.

Now test the curl statement.

```
> MG:=factor(MAGCURLB/((exp(-I*(k*z-omega*t)))^2)/(exp(I*(k*z-omega*t)))^2):Magn_of_curlBxBCC:=MG;MG:=factor(MAGCURLA/((exp(-I*(k*z-omega*t)))^2)/(exp(I*(k*z-omega*t)))^2):Magn_of_curlAxACC:=MG;
```

$$Magn\_of\_curlBxBCC := -64\,\frac{k^4}{(x^2+y^2)^3}$$

$$Magn\_of\_curlAxACC := -\frac{64}{(x^2+y^2)^3}$$

For the example is also evident that the curl of B x B* is not zero.
The curl of A x A* is not zero
But for this case the two curls ARE equivalent.

THE CONCLUSION IS THAT THE FIRST EVANS CLAIM IS VALID
for this and similar examples where the vector components are not functions of z,
except through the phase factor

BUT THE SECOND EVANS CLAIM IS NOT VALID
for this and similar examples.

Now display the magnitude of the magnetic field B, from A, A* or A + A*, the result is the same

```
> Longitudinal_Magnetic_Field:=B[3];
```

$$Longitudinal\_Magnetic\_Field := 0$$

THERE IS NO LONGITUDINAL MAGNETIC COMPONENT deducible from a curl operation on a vector potential (for the example displayed)
ACCORDING TO EVANS FORMULAS,
EVEN THOUGH THERE IS A NON-ZERO and longitudinal component of A x A*

From the vector potential it is possible to compute the electric field (from A, A* or A + A*)

```
> E:=-[diff(A[1],t),diff(A[2],t),diff(A[3],t)]:ESQ:=innerprod(E,E):BSQ:=innerprod(B,B):POINCARE1:=factor(omega^2*BSQ-k^2*ESQ);POINCARE2:=innerprod(E,B);
```

$$POINCARE1 := 0$$

$$POINCARE2 := 0$$

Now form the complex Poynting vector (Stratton P.137)

```
> COMPLEXExB:=crossprod(E,BCC);
```

$$COMPLEXExB := \left[0,\ 0,\ \omega\, \mathbf{e}^{(I(kz-\omega t))}\left(-2\frac{x}{(x^2+y^2)^2}+I\,y\right)k\,\mathbf{e}^{(-I(kz-\omega t))}\left(-2\frac{x}{(x^2+y^2)^2}-I\,y\right) + \omega\, \mathbf{e}^{(I(kz-\omega t))}\left(-2\frac{y}{(x^2+y^2)^2}+I\,x\right)k\,\mathbf{e}^{(-I(kz-\omega t))}\left(-2\frac{y}{(x^2+y^2)^2}-I\,x\right)\right]$$

Display the components of the Poynting vector

```
> POYExB1:=factor(COMPLEXExB[1]/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t))));POYExB2:=factor(COMPLEXExB[2]/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t))));;POYExB3:=factor(COMPLEXExB[3]/((exp(-I*(k*z-omega*t))))/(exp(I*(k*z-omega*t))));
```

$$POYExB1 := 0$$

$$POYExB2 := 0$$

$$POYExB3 := \frac{(x^4+2x^2+2+2y^2x^2+2y^2+y^4)(x^4-2x^2+2+2y^2x^2-2y^2+y^4)\,\omega\, k}{(x^2+y^2)^3}$$

```
>
```

REPRISE:
The examples chosen were very simple types of complex vector fields which were constructed from the gradients of a complex function, and then multiplied by an arbitrary phase factor. Such constructions do not exhaust the possibilities for vector fields, which could exhibit even more radical departure from Evan's claims.

However, the examples stand as counter examples which indicate the limitations of Evans' claims.

NOTE that there exist do cases where the "conjugate product" A^A* is non-zero, and is proportional to curl A ^ curl A*. Yet even in these cases, the does not exist a longitudinal magnetic field duducible from a curl of a vector potential.
Moreover, there is a Poynting power that is computable without making use of the conjugate product A^A* but exists using the electrical engineering concept of E x H* (a conjugate product to be found in pre WWII textbooks).

It would appear that the notation and the idea of a longitudinal magnetic field (a component of B in the direction of phase propapation) is not a result that can be deduced from the simple vector fields used in the above examples. However, the examples do indicate a non-zero value of the form A x A* , but it is not clear that this should be called **magnetism.**

IN SUMMARY
Using complex vector fields, the examples indicate

1. A^A* exists and can be in the direction orthogonal to a phase front (that is it can have a longitudinal component.)

2. Even though this longitudinal component of A ^A* can exist, the examples indicate that it is not necessarily constructed form the curl of linear combinations of A and or A*. In fact the Curls so constructed in the examples have zero longitudinal components - curl A(3) = 0 although A ^A* is not zero in the longitudinal direction !

3. There can be a Poynting power in the longitudinal direction, hence indicating interactions, but it is not due to a longitudinal component of B field, for that is always zero in the examples considered, even though the "conjugate interaction" A ^A* is not zero in the longitudinal direction.

4. I come to the conclusion that the EVANS ideas are NOT to be associated with a longitudinal magnetic field. The EVANS type of interaction (A ^A*) can occur, possibly, but the examples show that they can occur without a longitudinal magnetic field.

THE IDEA THAT an interaction depending on A^A*
implies a LONGITUDINAL B FIELD
IS MISLEADING.

If the A^A* interaction is not associated with a longitudinal field B field, and if the A^A* effect appears to exist experimentally, then is it a FARADAY effect?

I think in light of the examples, an alternate description of an A^A* interaction must be found. Professor Evans may not like the following suggestion, but in the light of the controversy that appears to be associated with the B(3) theory, perhaps an alternate explanation that resolves the paradoxes -- and yet preserves the novelty -- is required.

The other classical chiral effect is that due to OPTICAL ACTIVITY, which does not necessarily have a continuous expansion about the identity. From a classical constitutive matrix point of view, optical activity can be represented by a matrix which links magnetic excitation **H** (and therefore magnetization) to the **E** field, which is to be compared to Faraday phenomena which links magnetization to the **B** field. (See Handbuch der Physik or E. J. Post "The formal structure of Electromagnetics").

If the A^A* interaction is another way to construct OPTICAL ACTIVITY, no longitudinal **B** field is required. The A ^ A* effect exists; the longitudinal **B** field does not, -- in agreement with the examples above.

Recall that the optical active components of the 6x6 constitutive matrix can be hermitian or anti-hermitian. It is this latter anti-hermitian property that leads to a form of intrinsic **non-linearity** in classical optics. From this point of view, it could be conjectured that the EVANS A^A* interaction could be due to chiral effects of Optical Activity depending upon **E** fields, and is not to be associated with Faraday phenomena at all, which is associated with **B** fields.

THIS CONJECTURE HAS NOT BEEN PROVED,

but if true, then the misleading concept of a longitudinal B field is resolved.
The IFE would then be the IOAE, which does not require a longitudinal **B** field.

(THESE CONCEPTS ARE ENTIRELY DIFFERENT FROM A HOPF_RANADA TYPE electromagnetic system for which there can be an irreducible 3 component magnetic field. In these systems, of Pfaff dimension 3 or more, there can exist longitudinal **B** fields, and a Hopf invariant. My opinion at the time of writing is that the Hopf type fields are not directly related to the A^A* interaction displayed by the examples, but my intuition makes me think they might lead to a true induced Faraday effect.)

Having gone through this exercise, I feel a bit better about this bit of interesting science.

1. Yes there is the possibility of an EVANS A^A* chiral interaction
2. No there is no need for a longitudinal **B** field associated with this chiral interaction

If it is assumed that both of these statements are valid,
then they can be unified without conflict (at least in my mind) under the idea
that the effect is best considered as an exhibition of OPTICAL ACTIVITY,
not as a FARADAY interaction. The effect is due to magnetization induced by **E** fields,
and not by magnetization induced by **B** fields.

RMK

>