

A plot of a rotated ellipse showing the major and minor axes, and the angle of rotation. This was related to an elliptically polarized plane wave.

```
<< peeters` ;
peeters`setGitDir[ "../project/figures/GAelectrodynamics" ]
/Users/pjoot/project/figures/GAelectrodynamics

ClearAll[p1, bold, ellipse, fs]

bold = Style[#, Bold] &;

ellipse[a_, b_, psi_, phi_] := Module[{e, mu, f},
  e = Sqrt[1 - (b / a) ^2];
  mu = ArcTanh[ b / a ];
  f = e a Exp[I psi] Cosh[ mu + I phi ] ;
  {f // Re, f // Im}
]

fs := Style[#, FontSize -> 16] &;

plotEllipse[a_, b_, psi_] := Module[{te1, te2, e1, e2, o, va, vb, ea, eb, s},
  o = {0, 0};
  va = ellipse[a, b, psi, 0];
  vb = ellipse[a, b, psi, Pi / 2];
  s = 0.1;
  {e1, e2} = IdentityMatrix[2];
  te1 = Subscript["e" // bold, 1] // fs;
  te2 = Subscript["e" // bold, 2] // fs;
  ea = Subscript["E" // bold, "a"] // fs;
  eb = Subscript["E" // bold, "b"] // fs;
  Show[{
    ParametricPlot[
      ellipse[a, b, psi, t], {t, 0, 2 Pi},
      Ticks -> None
    ],
    ParametricPlot[(a / 5) {Cos[t], Sin[t]}, {t, 0, psi}],
    Graphics[{
      Arrow[{o, e1}],
      Arrow[{o, e2}],
      Text[te1, (1 + s) e1],
      Text[te2, (1 + s) e2],
      Arrow[{o, va}],
      Arrow[{o, vb}],
      Text[ea, va + s (va // Normalize)],
```

```

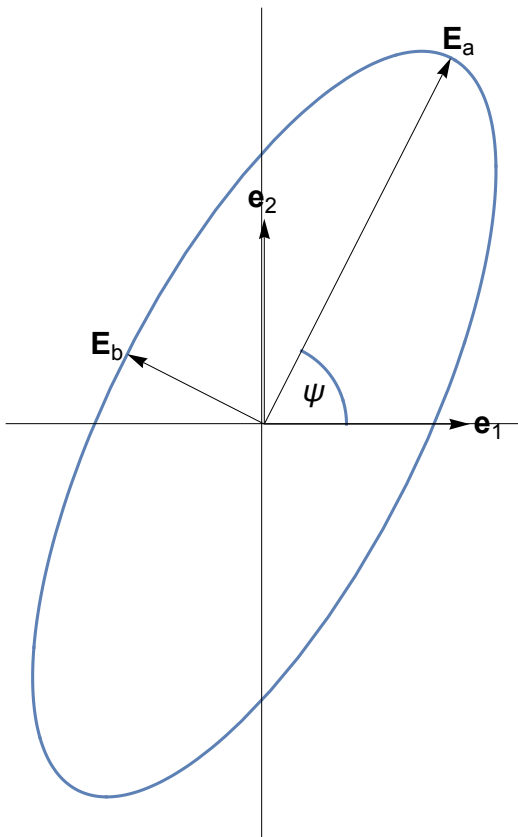
Text[eb, vb + s (vb // Normalize)],
Text[" $\psi$ " // fs, ellipse[a, b, psi / 2, 0] / 7]
}
, AspectRatio → 1
]
}]
];

```

```

p1 = plotEllipse[2, .75, 0.35 Pi]
(*p2 = plotEllipse[3,0,0.35 Pi] *)

```



```

peeters`exportForLatex["ellipticalPolarizationFig1", p1]
{ellipticalPolarizationFig1.eps, ellipticalPolarizationFig1pn.png}

```

```

Manipulate[
  plotEllipse[a, b, psi]
  , {{a, 3, "Ea"}, 1, 100}
  , {{b, 1.5, "Eb"}, 0, 0.99 a}
  , {{psi, 0.35 Pi, "ψ"}, 0, 2 Pi}
]

```

