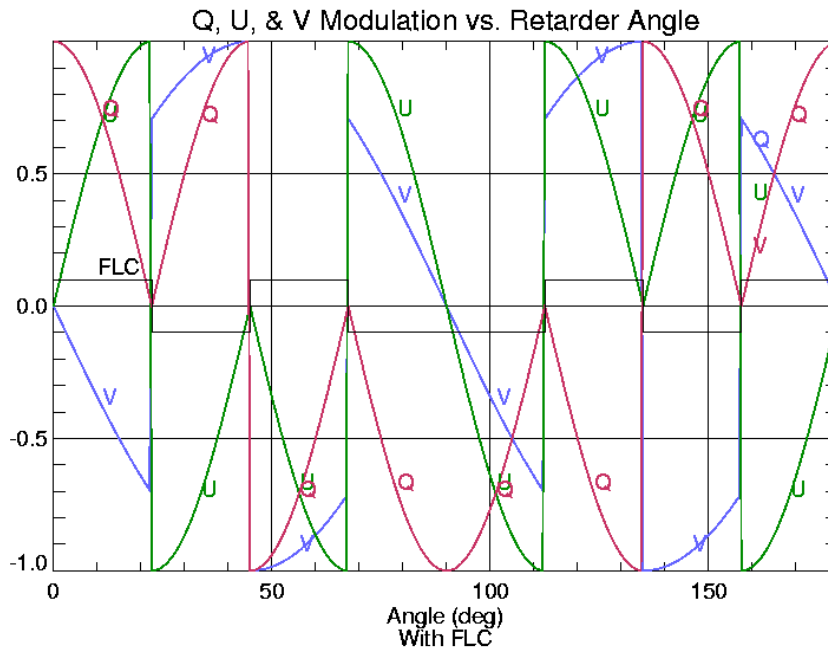
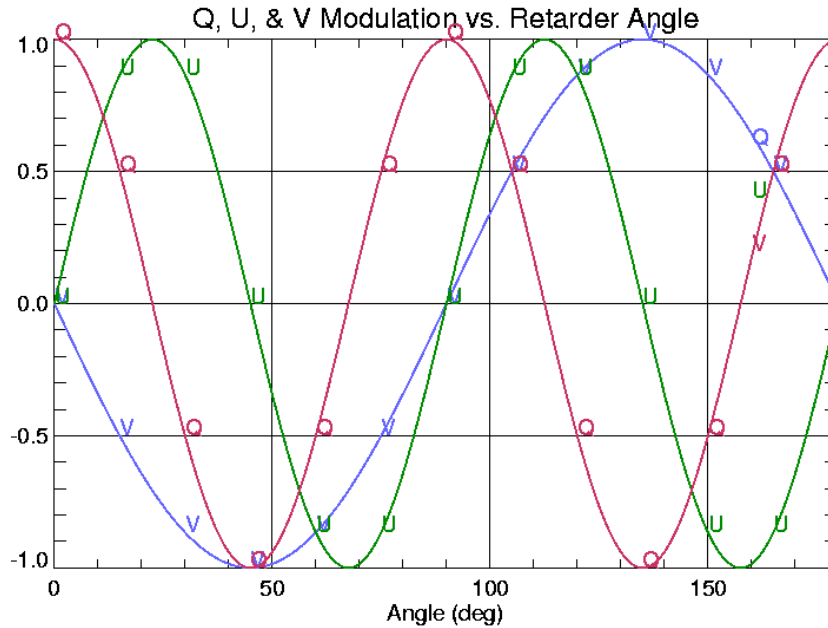


## Four-state polarization modulation using a rotating retarder and FLC

A simple polarimeter consists of a rotating retarder of approximately 0.35 waves retardance, a Ferroelectric Liquid Crystal (FLC) at 45°, and a linear polarizer at 0°. The wave form is sampled 16 times per rotation of the retarder, or 8 times per full modulation cycle. During these 8 intervals the FLC is switched on and off cycling the fast axis to 0°, 90°, 0°, 90°, 90°, 0°, 90°, and 0° during the 8 states.



Analysis of this scheme produces a diagonal polarimeter response matrix with no Q to I cross talk. Efficiencies for the encoding of Q, V are not the same for all modulation states so this modulation scheme, like a rotating retarder without a following FLC, is open to intensity to polarization cross talk even with a dual beam analyzer.

```
IDL> .r rotret4
Single retarder of retardance and orientations: continuous rotation
123.000
 11.2500  33.7500  56.2500  78.7500  101.250  123.750  146.250  168.750  191.250
Demodulation
I      1  1  1  1  1  1  1  1
Q      1  1 -1 -1 -1 -1  1  1
U      1 -1 -1  1 -1  1  1 -1
V     -1  1 -1  1 -1  1 -1  1
State #  1  2  3  4  3  4  1  2
```

```
Efficiency at each state
  I    Q    U    V
0.500  0.387  0.273 -0.160
0.500  0.159 -0.273  0.387
0.500 -0.159 -0.273 -0.387
0.500 -0.387  0.273  0.160
0.500 -0.387 -0.273 -0.160
0.500 -0.159  0.273  0.387
0.500  0.159  0.273 -0.387
0.500  0.387 -0.273  0.160
```

```
Polarimeter Response Matrix:
1.000  0.000  0.000 -0.000
0.000  0.546  0.000 -0.000
0.000 -0.000  0.546  0.000
0.000  0.000  0.000  0.548
```

- End-