Polarization Ray Trace Data

File : \\10.1.1.42\user\worku\Eigene Dateien\Zemax\Samples\Sequential\Objectives\Double Gauss 28 degree field.zmx
Title: DOUBLE GAUSS
Date : 27.10.2013

Lens units : Millimeters.
Wavelength : 0.587600000 µm
Normalized X Field Coord (Hx) : 0.000000000
Normalized Y Field Coord (Hy) : 0.000000000
Normalized X Pupil Coord (Px) : 0.000000000
Normalized Y Pupil Coord (Py) : 1.000000000

Input Polarization:
X-Field : 1.000000
Y-Field : 2.000000
X-Phase : 10.000000
Y-Phase : 20.000000

All coordinates and cosines are in global coordinates relative to surface 1.

Tracing ray to surface 1:

Path length through air	(tau):	2.6279917E+000		
Internal absorption per mm	(alpha):	0.0000000E+000		
Internal Transmittance of ray	(IT):	1.000000000000		
Propagation Phase Factors	(pc,ps):	-0.864366762953	-0.502861908582	
Coordinates on surface	(x,y,z):	0.0000000E+000	1.6665000E+001	2.6279917E+000
Direction cosines of incident ray	(l1,m1,n1):	0.000000000000	0.000000000000	1.000000000000
Cosine of angle of incident ray	:	0.951471206067 (17.922952 deg)		
Cosine of angle of exit ray	:	0.981501748399 (11.037602 deg)		
Direction cosines of exit ray	(l2,m2,n2):	0.000000000000	-0.119882991054	0.992788027958
Direction cosines of normal	(ln,mn,nn):	0.000000000000	0.307737784527	-0.951471206067
Direction cosines of S vector	(sx,sy,sz):	1.000000000000	0.000000000000	0.000000000000
Direction cosines of P vector	(px,py,pz):	0.000000000000	1.000000000000	0.000000000000
E field before coating (xyz)	(Exr,Eyr,Ezr):	-0.341632742495	-0.572657158186	0.000000000000
	(Exi,Eyi,Ezi):	-0.288594991736	-0.687068977016	-0.000000000000
E field before coating (s&p)	(Esr,Epr):	-0.341632742495	-0.572657158186	
	(Esi,Epi):	-0.288594991736	-0.687068977016	
Ray intensity before coating	(I1):	1.000000000000		
Coating	:	AR		
Intensity Reflection coefficients	(Rs,Rp):	0.008519096145	0.005644924882	
Intensity Transmission coefficients	(Ts,Tp):	0.991480903855	0.994355075118	
Intensity Absorption coefficients	(As,Ap):	0.000000000000	0.000000000000	
Diattenuation	(D):	0.001447335678		
Field Amplitude Reflection S pol	(rsr,rsi):	-0.092080793042	0.006342215485	
Field Amplitude Reflection P pol	(rpr,rpi):	-0.074907711076	0.005810310046	
Field Amplitude Transmission S pol	(tsr,tsi):	0.040576741810	-0.994904232517	
Field Amplitude Transmission P pol	(tpr,tpi):	0.040400881741	-0.996354778115	
Field Reflection Phase	(Prs,Prp):	3.072824622956	3.064181406776	
Field Reflection Retardance (P-S)	(Sr):	-0.008643216181 (-0.495220 deg)		
Field Reflection Retardance (P-S+pi)	(Sr):	3.132949437409 (179.504780 deg)		
Field Transmission Phase	(Pts,Ptp):	-1.530034347183	-1.530269837517	
Field Transmission Retardance (P-S)	(St):	-0.000235490334 (-0.013493 deg)		
Field Transmission Retardance (P-S+pi)	(St):	3.141357163256 (179.986507 deg)		
Ray Amplitude Reflection S pol	(rsr,rsi):	0.046609882255	-0.079665645172	
Ray Amplitude Reflection P pol	(rpr,rpi):	0.037379221668	-0.065174524693	
Ray Amplitude Transmission S pol	(tsr,tsi):	0.912221471694	-0.399165242020	
Ray Amplitude Transmission P pol	(tpr,tpi):	0.913448558179	-0.399958506197	
Ray Reflection Phase	(Prs,Prp):	-1.041428011354	-1.050071227535	
Ray Reflection Retardance (P-S)	(Sr):	-0.008643216181 (-0.495220 deg)		
Ray Reflection Retardance (P-S+pi)	(Sr):	3.132949437409 (179.504780 deg)		
Ray Transmission Phase	(Pts,Ptp):	-0.412473327699	-0.412708818033	
Ray Transmission Retardance (P-S)	(St):	-0.000235490334 (-0.013493 deg)		
Ray Transmission Retardance (P-S+pi)	(St):	3.141357163256 (179.986507 deg)		
Electric field after coating	(Esr,Epr):	-0.426841812860	-0.797891937178	
	(Esi,Epi):	-0.126894631745	-0.398563064873	
Ray intensity after coating	(I2):	0.993780240866		
Direction cosines of new S vector	(sx,sy,sz):	1.000000000000	0.000000000000	0.000000000000
Direction cosines of new P vector	(px,py,pz):	0.000000000000	0.992788027958	0.119882991054
E field after	(Exr,Eyr,Ezr):	-0.426841812860	-0.792137562834	-0.095653671967
	(Exi,Eyi,Ezi):	-0.126894631745	-0.395688639192	-0.047780932341
X, Y, and Z direction Amplitude	(Ax, Ay, Az):	0.445304593252	0.885466779523	0.106923535557
X, Y, and Z direction Phase	(Px, Py, Pz):	-2.852626468508	-2.678329033642	-2.678329033642
Phase difference between X and Y	(Pxy):	-0.174297434865 (-9.986507 deg)		
Major, Minor semi axis XY ellipse	(EM, Em):	0.988718705914	0.069158650832	
Angle of XY polarization ellipse	(Ap):	1.108490414216 (63.511822 deg)		
Ray intensity out	(I2):	0.993780240866		

Tracing ray to surface 2:

Path length through SK2	(tau):	6.9924627E+000		
Internal absorption per mm	(alpha):	2.6950591E-004		
Internal Transmittance of ray	(IT):	0.998117264550		
Propagation Phase Factors	(pc,ps):	0.687356853525	0.726319871621	
Coordinates on surface	(x,y,z):	0.0000000E+000	1.5826723E+001	9.5700250E+000
Direction cosines of incident ray	(l1,m1,n1):	0.000000000000	-0.119882991054	0.992788027958
Cosine of angle of incident ray	:	0.999868490747 (0.929224 deg)		
Cosine of angle of exit ray	:	0.999660188515 (1.493719 deg)		
Direction cosines of exit ray	(l2,m2,n2):	0.000000000000	-0.129658254636	0.991558741076
Direction cosines of normal	(ln,mn,nn):	0.000000000000	0.103766872032	-0.994601647027
Direction cosines of S vector	(sx,sy,sz):	-1.000000000000	-0.000000000000	-0.000000000000

```
Direction cosines of P vector     (px,py,pz):  0.000000000000 -0.992788027958 -0.119882991054
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.201037035374 -0.256842535908 -0.031014728792
                               (Exi,Eyi,Ezi): -0.396871455171 -0.846526531178 -0.102221350083
E field before coating (s&p)       (Esr,Epr):  0.201037035374  0.258708333174
                                   (Esi,Epi):  0.396871455171  0.852676006700
Ray intensity before coating            (I1):  0.991909215577
Coating                                     :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.006940505083  0.006921727617
Intensity Transmission coefficients  (Ts,Tp):  0.993059494917  0.993078272383
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                           (D):  0.000009454261
Field Amplitude Reflection S pol   (rsr,rsi): -0.083309644004 -0.000091098462
Field Amplitude Reflection P pol   (rpr,rpi): -0.083196870947 -0.000091005689
Field Amplitude Transmission S pol (tsr,tsi):  0.000286962338 -0.996523663828
Field Amplitude Transmission P pol (tpr,tpi):  0.000286953837 -0.996533085271
Field Reflection Phase             (Prs,Prp): -3.140499161636 -3.140498794513
Field Reflection Retardance (P-S)       (Sr):  0.000000367123 (0.000021 deg)
Field Reflection Retardance (P-S+pi)    (Sr): -3.141592286467 (-179.999979 deg)
Field Transmission Phase           (Pts,Ptp): -1.570508363407 -1.570508374661
Field Transmission Retardance (P-S)     (St): -0.000000011253 (-0.000001 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141592642336 (179.999999 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.054245883946 -0.063228863330
Ray Amplitude Reflection P pol     (rpr,rpi):  0.054172476584 -0.063143252989
Ray Amplitude Transmission S pol   (tsr,tsi):  0.905429761031 -0.416240847055
Ray Amplitude Transmission P pol   (tpr,tpi):  0.905438316557 -0.416244792512
Ray Reflection Phase               (Prs,Prp): -0.861716965378 -0.861716598256
Ray Reflection Retardance (P-S)         (Sr):  0.000000367123 (0.000021 deg)
Ray Reflection Retardance (P-S+pi)      (Sr): -3.141592286467 (-179.999979 deg)
Ray Transmission Phase             (Pts,Ptp): -0.430904587299 -0.430904598553
Ray Transmission Retardance (P-S)       (St): -0.000000011253 (-0.000001 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141592642336 (179.999999 deg)
Electric field after coating       (Esr,Epr):  0.347219025570  0.589166385157
                                   (Esi,Epi):  0.275659400922  0.664359531611
Ray intensity after coating             (I2):  0.985039773676
Direction cosines of new S vector (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000 -0.991558741076 -0.129658254636
E field after                  (Exr,Eyr,Ezr): -0.347219025570 -0.584193079151 -0.076390285190
                               (Exi,Eyi,Ezi): -0.275659400922 -0.658751500786 -0.086139697320
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.443338648252  0.880474357103  0.115132632758
X, Y, and Z direction Phase     (Px, Py, Pz): -2.470578391436 -2.296280967824 -2.296280967824
Phase difference between X and Y       (Pxy): -0.174297423612 (-9.986507 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.983384864298  0.068836467218
Angle of XY polarization ellipse        (Ap):  1.107994578055 (63.483413 deg)
Ray intensity out                       (I2):  0.985039773676


Tracing ray to surface 3:

Path length through air                (tau):  3.1759624E+000
Internal absorption per mm           (alpha):  0.0000000E+000
Internal Transmittance of ray           (IT):  1.000000000000
Propagation Phase Factors             (pc,ps):  0.986069782001  0.166332152709
Coordinates on surface                (x,y,z):  0.0000000E+000  1.5414933E+001  1.2719178E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.129658254636  0.991558741076
Cosine of angle of incident ray             :  0.951377667789 (17.940359 deg)
Cosine of angle of exit ray                 :  0.981766251211 (10.958162 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.249231500157  0.968443937112
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.428780672100 -0.903408620301
Direction cosines of S vector     (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000  0.991558741076  0.129658254636
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.296531167280 -0.466483586979 -0.060998350575
                               (Exi,Eyi,Ezi): -0.329573093358 -0.746745041226 -0.097645913139
E field before coating (s&p)       (Esr,Epr): -0.296531167280 -0.470454817908
                                   (Esi,Epi): -0.329573093358 -0.753102171653
Ray intensity before coating            (I1):  0.985039773676
Coating                                     :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.007781458336  0.005084394597
Intensity Transmission coefficients  (Ts,Tp):  0.992218541664  0.994915605403
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                           (D):  0.001357263043
Field Amplitude Reflection S pol   (rsr,rsi): -0.087958219336  0.006694026244
Field Amplitude Reflection P pol   (rpr,rpi): -0.071040580903  0.006134367244
Field Amplitude Transmission S pol (tsr,tsi):  0.040727072825 -0.995268731149
Field Amplitude Transmission P pol (tpr,tpi):  0.040534923695 -0.996630586208
Field Reflection Phase             (Prs,Prp):  3.065634462486  3.055456133535
Field Reflection Retardance (P-S)       (Sr): -0.010178328951 (-0.583175 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.131414324638 (179.416825 deg)
Field Transmission Phase           (Pts,Ptp): -1.529898464899 -1.530146766828
Field Transmission Retardance (P-S)     (St): -0.000248301929 (-0.014227 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141344351661 (179.985773 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.043981411933 -0.076466291531
Ray Amplitude Reflection P pol     (rpr,rpi):  0.034920576032 -0.062168705681
Ray Amplitude Transmission S pol   (tsr,tsi):  0.912600141354 -0.399223651184
Ray Amplitude Transmission P pol   (tpr,tpi):  0.913740330714 -0.399992766723
Ray Reflection Phase               (Prs,Prp): -1.048831397643 -1.059009726594
Ray Reflection Retardance (P-S)         (Sr): -0.010178328951 (-0.583175 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.131414324638 (179.416825 deg)
Ray Transmission Phase             (Pts,Ptp): -0.412374653800 -0.412622955728
Ray Transmission Retardance (P-S)       (St): -0.000248301929 (-0.014227 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141344351661 (179.985773 deg)
Electric field after coating       (Esr,Epr): -0.402187758838 -0.731108962166
                                   (Esi,Epi): -0.182386196294 -0.499961303154
Ray intensity after coating             (I2):  0.979501337169
Direction cosines of new S vector (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000  0.968443937112  0.249231500157
E field after                  (Exr,Eyr,Ezr): -0.402187758838 -0.708038041778 -0.182215383419
```

```
                              (Exi,Eyi,Ezi): -0.182386196294 -0.484184492830 -0.124606105606
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.441610368943  0.857760159778  0.220746749713
X, Y, and Z direction Phase     (Px, Py, Pz): -2.715844215369 -2.541795093686 -2.541795093686
Phase difference between X and Y       (Pxy): -0.174049121683 (-9.972280 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.962354431132  0.068162735726
Angle of XY polarization ellipse       (Ap):  1.098954389019 (62.965448 deg)
Ray intensity out                      (I2):  0.979501337169


Tracing ray to surface 4:

Path length through SK16               (tau):  1.0870510E+001
Internal absorption per mm           (alpha):  3.5012798E-004
Internal Transmittance of ray           (IT):  0.996201164121
Propagation Phase Factors            (pc,ps): -0.301840157723 -0.953358547025
Coordinates on surface               (x,y,z):  0.0000000E+000  1.2705659E+001  2.3246658E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.249231500157  0.968443937112
Cosine of angle of incident ray             :  0.968443937112 (14.432041 deg)
Cosine of angle of exit ray                 :  0.967760425727 (14.588345 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.251872504248  0.967760425727
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.000000000000 -1.000000000000
Direction cosines of S vector     (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000 -0.968443937112 -0.249231500157
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.052383240485 -0.247415821134 -0.063673088241
                               (Exi,Eyi,Ezi):  0.437646965227  0.819599231449  0.210925938151
E field before coating (s&p)       (Esr,Epr):  0.052383240485  0.255477691225
                                   (Esi,Epi): -0.437646965227 -0.846305294546
Ray intensity before coating            (I1):  0.975780372346
Coating                                     :  None defined, assuming bare glass.
Intensity Reflection coefficients    (Rs,Rp):  0.000031622367  0.000024180470
Intensity Transmission coefficients  (Ts,Tp):  0.999968377633  0.999975819530
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                           (D):  0.000003721052
Field Amplitude Reflection S pol   (rsr,rsi):  0.005623376831  0.000000000000
Field Amplitude Reflection P pol   (rpr,rpi):  0.004917364168  0.000000000000
Field Amplitude Transmission S pol (tsr,tsi):  0.999984188692 -0.000000000000
Field Amplitude Transmission P pol (tpr,tpi):  0.999987909692 -0.000000000000
Field Reflection Phase             (Prs,Prp):  0.000000000000  0.000000000000
Field Reflection Retardance (P-S)       (Sr):  0.000000000000 (0.000000 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.141592653590 (180.000000 deg)
Field Transmission Phase           (Pts,Ptp): -0.000000000000 -0.000000000000
Field Transmission Retardance (P-S)     (St):  0.000000000000 (0.000000 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141592653590 (180.000000 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.005623376831  0.000000000000
Ray Amplitude Reflection P pol     (rpr,rpi):  0.004917364168  0.000000000000
Ray Amplitude Transmission S pol   (tsr,tsi):  0.999984188692  0.000000000000
Ray Amplitude Transmission P pol   (tpr,tpi):  0.999987909692  0.000000000000
Ray Reflection Phase               (Prs,Prp):  0.000000000000  0.000000000000
Ray Reflection Retardance (P-S)         (Sr):  0.000000000000 (0.000000 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.141592653590 (180.000000 deg)
Ray Transmission Phase             (Pts,Ptp):  0.000000000000  0.000000000000
Ray Transmission Retardance (P-S)       (St):  0.000000000000 (0.000000 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141592653590 (180.000000 deg)
Electric field after coating       (Esr,Epr):  0.052382412238  0.255474602421
                                   (Esi,Epi): -0.437640045456 -0.846295062454
Ray intensity after coating             (I2):  0.975755331715
Direction cosines of new S vector (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000 -0.967760425727 -0.251872504248
E field after                  (Exr,Eyr,Ezr): -0.052382412238 -0.247238210001 -0.064347027884
                               (Exi,Eyi,Ezi):  0.437640045456  0.819010869931  0.213158456713
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.440763798988  0.855514779270  0.222659083951
X, Y, and Z direction Phase     (Px, Py, Pz):  1.689922514896  1.863971636579  1.863971636579
Phase difference between X and Y       (Pxy): -0.174049121683 (-9.972280 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.959974606708  0.068022191411
Angle of XY polarization ellipse       (Ap):  1.098667121141 (62.948989 deg)
Ray intensity out                      (I2):  0.975755331715


Tracing ray to surface 5:

Path length through F5                 (tau):  6.8886866E+000
Internal absorption per mm           (alpha):  2.0050148E-004
Internal Transmittance of ray           (IT):  0.998619761542
Propagation Phase Factors            (pc,ps): -0.957356967461  0.288907661468
Coordinates on surface               (x,y,z):  0.0000000E+000  1.0970589E+001  2.9913256E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.251872504248  0.967760425727
Cosine of angle of incident ray             :  0.966265933747 (14.924524 deg)
Cosine of angle of exit ray                 :  0.910751741901 (24.390556 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.089282181050  0.996006371539
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.492619028814 -0.870245076085
Direction cosines of S vector     (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000  0.967760425727  0.251872504248
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.076236228156  0.000076654863  0.000019950446
                               (Exi,Eyi,Ezi): -0.433811734888 -0.854924164768 -0.222505368682
E field before coating (s&p)       (Esr,Epr): -0.076236228156  0.000079208512
                                   (Esi,Epi): -0.433811734888 -0.883404758079
Ray intensity before coating            (I1):  0.974408556680
Coating                                     :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.010555851423  0.004784148842
Intensity Transmission coefficients  (Ts,Tp):  0.989444148577  0.995215851158
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                           (D):  0.002908156854
Field Amplitude Reflection S pol   (rsr,rsi): -0.099205504336 -0.026723011286
Field Amplitude Reflection P pol   (rpr,rpi): -0.066248471324 -0.019881873393
Field Amplitude Transmission S pol (tsr,tsi):  0.073884027738 -0.991960331375
Field Amplitude Transmission P pol (tpr,tpi):  0.073303086815 -0.994908291563
```

```
Field Reflection Phase             (Prs,Prp): -2.878467874726 -2.850034326250
Field Reflection Retardance (P-S)       (Sr):  0.028433548476 (1.629122 deg)
Field Reflection Retardance (P-S+pi)    (Sr): -3.113159105113 (-178.370878 deg)
Field Transmission Phase           (Pts,Ptp): -1.496450761019 -1.497250979662
Field Transmission Retardance (P-S)     (St): -0.000800218643 (-0.045849 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.140792434947 (179.954151 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.071406858497 -0.073870914319
Ray Amplitude Reflection P pol     (rpr,rpi):  0.049466794704 -0.048344441915
Ray Amplitude Transmission S pol   (tsr,tsi):  0.918949113795 -0.380758026615
Ray Amplitude Transmission P pol   (tpr,tpi):  0.921319587136 -0.382604325011
Ray Reflection Phase               (Prs,Prp): -0.802357533934 -0.773923985458
Ray Reflection Retardance (P-S)         (Sr):  0.028433548476 (1.629122 deg)
Ray Reflection Retardance (P-S+pi)      (Sr): -3.113159105113 (-178.370878 deg)
Ray Transmission Phase             (Pts,Ptp): -0.392807602576 -0.393607821219
Ray Transmission Retardance (P-S)       (St): -0.000800218643 (-0.045849 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.140792434947 (179.954151 deg)
Electric field after coating       (Esr,Epr): -0.235234514402 -0.337921504823
                                   (Esi,Epi): -0.369623353540 -0.813928412506
Ray intensity after coating             (I2):  0.968627104355
Direction cosines of new S vector (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000  0.996006371539  0.089282181050
E field after                  (Exr,Eyr,Ezr): -0.235234514402 -0.336571971884 -0.030170368974
                               (Exi,Eyi,Ezi): -0.369623353540 -0.810677884833 -0.072669303887
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.438128634362  0.877769517137  0.078683409252
X, Y, and Z direction Phase     (Px, Py, Pz): -2.137563388292 -1.964314485252 -1.964314485252
Phase difference between X and Y       (Pxy): -0.173248903040 (-9.926431 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.978696912278  0.067737577168
Angle of XY polarization ellipse        (Ap):  1.111468431932 (63.682450 deg)
Ray intensity out                       (I2):  0.968627104355


Tracing ray to surface 6:

Path length through air                (tau):  1.1408990E+001
Internal absorption per mm           (alpha):  0.0000000E+000
Internal Transmittance of ray           (IT):  1.000000000000
Propagation Phase Factors            (pc,ps): -0.018108014979 -0.999836036455
Coordinates on surface               (x,y,z):  0.0000000E+000  9.9519691E+000  4.1276683E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.089282181050  0.996006371539
Cosine of angle of incident ray              :  0.996006371539 (5.122313 deg)
Cosine of angle of exit ray                  :  0.996006371539 (5.122313 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.089282181050  0.996006371539
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.000000000000 -1.000000000000
Direction cosines of S vector     (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000 -0.996006371539 -0.089282181050
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.365303118674 -0.804450312905 -0.072111063277
                               (Exi,Eyi,Ezi):  0.241889089739  0.351196553632  0.031481318977
E field before coating (s&p)       (Esr,Epr):  0.365303118674  0.807675870247
                                   (Esi,Epi): -0.241889089739 -0.352604725901
Ray intensity before coating            (I1):  0.968627104355
Coating                                      :  None defined, assuming bare glass.
Intensity Reflection coefficients    (Rs,Rp):  0.000000000000  0.000000000000
Intensity Transmission coefficients  (Ts,Tp):  1.000000000000  1.000000000000
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                           (D):  0.000000000000
Field Amplitude Reflection S pol   (rsr,rsi):  0.000000000000  0.000000000000
Field Amplitude Reflection P pol   (rpr,rpi):  0.000000000000  0.000000000000
Field Amplitude Transmission S pol (tsr,tsi):  1.000000000000 -0.000000000000
Field Amplitude Transmission P pol (tpr,tpi):  1.000000000000 -0.000000000000
Field Reflection Phase             (Prs,Prp):  0.000000000000  0.000000000000
Field Reflection Retardance (P-S)       (Sr):  0.000000000000 (0.000000 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.141592653590 (180.000000 deg)
Field Transmission Phase           (Pts,Ptp): -0.000000000000 -0.000000000000
Field Transmission Retardance (P-S)     (St):  0.000000000000 (0.000000 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141592653590 (180.000000 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.000000000000  0.000000000000
Ray Amplitude Reflection P pol     (rpr,rpi):  0.000000000000  0.000000000000
Ray Amplitude Transmission S pol   (tsr,tsi):  1.000000000000  0.000000000000
Ray Amplitude Transmission P pol   (tpr,tpi):  1.000000000000  0.000000000000
Ray Reflection Phase               (Prs,Prp):  0.000000000000  0.000000000000
Ray Reflection Retardance (P-S)         (Sr):  0.000000000000 (0.000000 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.141592653590 (180.000000 deg)
Ray Transmission Phase             (Pts,Ptp):  0.000000000000  0.000000000000
Ray Transmission Retardance (P-S)       (St):  0.000000000000 (0.000000 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141592653590 (180.000000 deg)
Electric field after coating       (Esr,Epr):  0.365303118674  0.807675870247
                                   (Esi,Epi): -0.241889089739 -0.352604725901
Ray intensity after coating             (I2):  0.968627104355
Direction cosines of new S vector (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000 -0.996006371539 -0.089282181050
E field after                  (Exr,Eyr,Ezr): -0.365303118674 -0.804450312905 -0.072111063277
                               (Exi,Eyi,Ezi):  0.241889089739  0.351196553632  0.031481318977
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.438128634362  0.877769517137  0.078683409252
X, Y, and Z direction Phase     (Px, Py, Pz):  2.556716587364  2.729965490404  2.729965490404
Phase difference between X and Y       (Pxy): -0.173248903040 (-9.926431 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.978696912278  0.067737577168
Angle of XY polarization ellipse        (Ap):  1.111468431932 (63.682450 deg)
Ray intensity out                       (I2):  0.968627104355


Tracing ray to surface 7:

Path length through air                (tau):  1.0849276E+001
Internal absorption per mm           (alpha):  0.0000000E+000
Internal Transmittance of ray           (IT):  1.000000000000
Propagation Phase Factors            (pc,ps): -0.248205816343  0.968707320471
```

```
Coordinates on surface              (x,y,z):  0.0000000E+000  8.9833221E+000  5.2082631E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.089282181050  0.996006371539
Cosine of angle of incident ray             :  0.901875550991 (25.594294 deg)
Cosine of angle of exit ray                 :  0.963022201549 (15.629878 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000  0.084410083012  0.996431100421
Direction cosines of normal       (ln,mn,nn): -0.000000000000 -0.349749290587 -0.936843334680
Direction cosines of S vector     (sx,sy,sz): -1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz): -0.000000000000 -0.996006371539 -0.089282181050
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.143649373190 -0.140537425806 -0.012597798823
                               (Exi,Eyi,Ezi): -0.413910084234 -0.866445934357 -0.077668361360
E field before coating (s&p)       (Esr,Epr):  0.143649373190  0.141100930498
                                   (Esi,Epi):  0.413910084234  0.869920071914
Ray intensity before coating            (I1):  0.968627104355
Coating                                     :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.011012735949  0.004564790733
Intensity Transmission coefficients  (Ts,Tp):  0.988987264051  0.995435209267
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                         (D):  0.003249280485
Field Amplitude Reflection S pol   (rsr,rsi): -0.104138706870  0.012956298869
Field Amplitude Reflection P pol   (rpr,rpi): -0.066692379800  0.010812826136
Field Amplitude Transmission S pol (tsr,tsi):  0.081055672578 -0.991169633309
Field Amplitude Transmission P pol (tpr,tpi):  0.080353471582 -0.994473996076
Field Reflection Phase             (Prs,Prp):  3.017814819557  2.980861388545
Field Reflection Retardance (P-S)       (Sr): -0.036953431012 (-2.117276 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.104639222578 (177.882724 deg)
Field Transmission Phase           (Pts,Ptp): -1.489200097549 -1.490171506512
Field Transmission Retardance (P-S)     (St): -0.000971408964 (-0.055658 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.140621244626 (179.944342 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.037096098887 -0.098166264043
Ray Amplitude Reflection P pol     (rpr,rpi):  0.021531846752 -0.064040380292
Ray Amplitude Transmission S pol   (tsr,tsi):  0.920577005012 -0.376198407618
Ray Amplitude Transmission P pol   (tpr,tpi):  0.923206025817 -0.378319763115
Ray Reflection Phase               (Prs,Prp): -1.209493928319 -1.246447359330
Ray Reflection Retardance (P-S)         (Sr): -0.036953431012 (-2.117276 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.104639222578 (177.882724 deg)
Ray Transmission Phase             (Pts,Ptp): -0.387945256039 -0.388916665003
Ray Transmission Retardance (P-S)       (St): -0.000971408964 (-0.055658 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.140621244626 (179.944342 deg)
Electric field after coating       (Esr,Epr):  0.287952624329  0.459373184819
                                   (Esi,Epi):  0.326995440239  0.749734181769
Ray intensity after coating             (I2):  0.962967798038
Direction cosines of new S vector (sx,sy,sz): -1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000 -0.996431100421  0.084410083012
E field after                  (Exr,Eyr,Ezr): -0.287952624329 -0.457733728053  0.038775728664
                               (Exi,Eyi,Ezi): -0.326995440239 -0.747058455763  0.063285124520
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.435709458004  0.876137262148  0.074219701690
X, Y, and Z direction Phase     (Px, Py, Pz): -2.292789976813 -2.120512482737  1.021080170853
Phase difference between X and Y       (Pxy): -0.172277494076 (-9.870773 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.976199465155  0.067036095883
Angle of XY polarization ellipse       (Ap):  1.112900525839 (63.764503 deg)
Ray intensity out                       (I2):  0.962967798038


Tracing ray to surface 8:

Path length through F5                 (tau):  5.4184850E+000
Internal absorption per mm           (alpha):  2.0050148E-004
Internal Transmittance of ray           (IT):  0.998914175675
Propagation Phase Factors            (pc,ps): -0.158079293312  0.987426421069
Coordinates on surface              (x,y,z):  0.0000000E+000  9.4406968E+000  5.7481778E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000  0.084410083012  0.996431100421
Cosine of angle of incident ray             :  0.996431100421 (4.842103 deg)
Cosine of angle of exit ray                 :  0.996505681826 (4.791212 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000  0.083525002780  0.996505681826
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.000000000000 -1.000000000000
Direction cosines of S vector     (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000  0.996431100421 -0.084410083012
E field before coating (xyz)   (Exr,Eyr,Ezr):  0.368203219675  0.809583590516 -0.068581779565
                               (Exi,Eyi,Ezi): -0.232514483333 -0.333702585278  0.028268751259
E field before coating (s&p)       (Esr,Epr):  0.368203219675  0.812483261687
                                   (Esi,Epi): -0.232514483333 -0.334897801903
Ray intensity before coating            (I1):  0.961922184179
Coating                                     :  None defined, assuming bare glass.
Intensity Reflection coefficients    (Rs,Rp):  0.000028172666  0.000027383759
Intensity Transmission coefficients  (Ts,Tp):  0.999971827334  0.999972616241
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                         (D):  0.000000394465
Field Amplitude Reflection S pol   (rsr,rsi): -0.005307792975  0.000000000000
Field Amplitude Reflection P pol   (rpr,rpi): -0.005232949323  0.000000000000
Field Amplitude Transmission S pol (tsr,tsi):  0.999985913568 -0.000000000000
Field Amplitude Transmission P pol (tpr,tpi):  0.999986308027 -0.000000000000
Field Reflection Phase             (Prs,Prp):  3.141592653590  3.141592653590
Field Reflection Retardance (P-S)       (Sr):  0.000000000000 (0.000000 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.141592653590 (180.000000 deg)
Field Transmission Phase           (Pts,Ptp): -0.000000000000 -0.000000000000
Field Transmission Retardance (P-S)     (St):  0.000000000000 (0.000000 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141592653590 (180.000000 deg)
Ray Amplitude Reflection S pol     (rsr,rsi): -0.005307792975  0.000000000000
Ray Amplitude Reflection P pol     (rpr,rpi): -0.005232949323  0.000000000000
Ray Amplitude Transmission S pol   (tsr,tsi):  0.999985913568  0.000000000000
Ray Amplitude Transmission P pol   (tpr,tpi):  0.999986308027  0.000000000000
Ray Reflection Phase               (Prs,Prp):  3.141592653590  3.141592653590
Ray Reflection Retardance (P-S)         (Sr):  0.000000000000 (0.000000 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.141592653590 (180.000000 deg)
Ray Transmission Phase             (Pts,Ptp):  0.000000000000  0.000000000000
Ray Transmission Retardance (P-S)       (St):  0.000000000000 (0.000000 deg)
```

```
Ray Transmission Retardance (P-S+pi)    (St):  3.141592653590 (180.000000 deg)
Electric field after coating       (Esr,Epr):  0.368198033005  0.812472137188
                                   (Esi,Epi): -0.232511208034 -0.334893216491
Ray intensity after coating             (I2):  0.961895693528
Direction cosines of new S vector (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000  0.996505681826 -0.083525002780
E field after                  (Exr,Eyr,Ezr):  0.368198033005  0.809633101033 -0.067861737517
                               (Exi,Eyi,Ezi): -0.232511208034 -0.333722993038  0.027971956838
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.435466707533  0.875715018925  0.073400584386
X, Y, and Z direction Phase     (Px, Py, Pz): -0.563248465621 -0.390970971544  2.750621682045
Phase difference between X and Y       (Pxy): -0.172277494076 (-9.870773 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.975714652743  0.066999732551
Angle of XY polarization ellipse        (Ap):  1.112930642272 (63.766229 deg)
Ray intensity out                       (I2):  0.961895693528


Tracing ray to surface 9:

Path length through SK16                (tau):  9.4243309E+000
Internal absorption per mm            (alpha):  3.5012798E-004
Internal Transmittance of ray            (IT):  0.996705716108
Propagation Phase Factors              (pc,ps):  0.240259340104 -0.970708735663
Coordinates on surface                 (x,y,z):  0.0000000E+000  1.0227864E+001  6.6873177E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000  0.083525002780  0.996505681826
Cosine of angle of incident ray              :  0.980734922996 (11.264780 deg)
Cosine of angle of exit ray                  :  0.948580545224 (18.453557 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.041833194317  0.999124608772
Direction cosines of normal       (ln,mn,nn): -0.000000000000 -0.276576610733 -0.960991872180
Direction cosines of S vector     (sx,sy,sz): -1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000 -0.996505681826  0.083525002780
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.137011407984 -0.129212551347  0.010830323306
                               (Exi,Eyi,Ezi): -0.412594750656 -0.864670226777  0.072474833222
E field before coating (s&p)       (Esr,Epr):  0.137011407984  0.129665644365
                                   (Esi,Epi):  0.412594750656  0.867702254535
Ray intensity before coating            (I1):  0.958726936039
Coating                                      :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.007884276630  0.005018886277
Intensity Transmission coefficients  (Ts,Tp):  0.992115723370  0.994981113723
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                            (D):  0.001441998346
Field Amplitude Reflection S pol   (rsr,rsi): -0.087567068467 -0.014706636246
Field Amplitude Reflection P pol   (rpr,rpi): -0.069733812424 -0.012493265469
Field Amplitude Transmission S pol (tsr,tsi):  0.043044054953 -0.995119556990
Field Amplitude Transmission P pol (tpr,tpi):  0.042829036558 -0.996567502656
Field Reflection Phase             (Prs,Prp): -2.975198396858 -2.964316867756
Field Reflection Retardance (P-S)       (Sr):  0.010881529103 (0.623466 deg)
Field Reflection Retardance (P-S+pi)    (Sr): -3.130711124487 (-179.376534 deg)
Field Transmission Phase           (Pts,Ptp): -1.527568114186 -1.527846203053
Field Transmission Retardance (P-S)     (St): -0.000278088867 (-0.015933 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141314564723 (179.984067 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.061039074565 -0.064486494756
Ray Amplitude Reflection P pol     (rpr,rpi):  0.049257162332 -0.050917759537
Ray Amplitude Transmission S pol   (tsr,tsi):  0.913042514270 -0.398081763594
Ray Amplitude Transmission P pol   (tpr,tpi):  0.914249173499 -0.398910469251
Ray Reflection Phase               (Prs,Prp): -0.812855149616 -0.801973620513
Ray Reflection Retardance (P-S)         (Sr):  0.010881529103 (0.623466 deg)
Ray Reflection Retardance (P-S+pi)      (Sr): -3.130711124487 (-179.376534 deg)
Ray Transmission Phase             (Pts,Ptp): -0.411146339764 -0.411424428630
Ray Transmission Retardance (P-S)       (St): -0.000278088867 (-0.015933 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141314564723 (179.984067 deg)
Electric field after coating       (Esr,Epr):  0.289343686420  0.464682221718
                                   (Esi,Epi):  0.322174805590  0.741571086013
Ray intensity after coating             (I2):  0.953373617020
Direction cosines of new S vector (sx,sy,sz): -1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz): -0.000000000000 -0.999124608772 -0.041833194317
E field after                  (Exr,Eyr,Ezr): -0.289343686420 -0.464275442978 -0.019439141677
                               (Exi,Eyi,Ezi): -0.322174805590 -0.740921921189 -0.031022287341
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.433031608810  0.874366616615  0.036609596296
X, Y, and Z direction Phase     (Px, Py, Pz): -2.302558124244 -2.130558719034 -2.130558719034
Phase difference between X and Y       (Pxy): -0.171999405210 (-9.854840 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.973448346783  0.066570794084
Angle of XY polarization ellipse        (Ap):  1.114544595757 (63.858701 deg)
Ray intensity out                       (I2):  0.953373617020


Tracing ray to surface 10:

Path length through air                 (tau):  2.2061439E+000
Internal absorption per mm            (alpha):  0.0000000E+000
Internal Transmittance of ray            (IT):  1.000000000000
Propagation Phase Factors              (pc,ps): -0.999994437190 -0.003335504373
Coordinates on surface                 (x,y,z):  0.0000000E+000  1.0135574E+001  6.9077390E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.041833194317  0.999124608772
Cosine of angle of incident ray              :  0.999952178515 (0.560339 deg)
Cosine of angle of exit ray                  :  0.999981787570 (0.345798 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.045574065398  0.998960962482
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.051602238234 -0.998667717016
Direction cosines of S vector     (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000  0.999124608772  0.041833194317
E field before coating (xyz)   (Exr,Eyr,Ezr):  0.288267461383  0.461801511993  0.019335558565
                               (Exi,Eyi,Ezi):  0.323138120524  0.742466392351  0.031086954112
E field before coating (s&p)       (Esr,Epr):  0.288267461383  0.462206123179
                                   (Esi,Epi):  0.323138120524  0.743116910376
Ray intensity before coating            (I1):  0.953373617020
Coating                                      :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.006280747904  0.006278278623
```

```
Intensity Transmission coefficients  (Ts,Tp):  0.993719252096  0.993721721377
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                         (D):  0.000001242443
Field Amplitude Reflection S pol   (rsr,rsi): -0.079251169477  0.000006392089
Field Amplitude Reflection P pol   (rpr,rpi): -0.079235589110  0.000006391550
Field Amplitude Transmission S pol (tsr,tsi):  0.000040451168 -0.996854678707
Field Amplitude Transmission P pol (tpr,tpi):  0.000040450985 -0.996855917242
Field Reflection Phase             (Prs,Prp):  3.141511997506  3.141511988447
Field Reflection Retardance (P-S)       (Sr): -0.000000009059 (-0.000001 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.141592644530 (179.999999 deg)
Field Transmission Phase           (Pts,Ptp): -1.570755747994 -1.570755748228
Field Transmission Retardance (P-S)     (St): -0.000000000234 (-0.000000 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141592653356 (180.000000 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.051572640927 -0.060174833711
Ray Amplitude Reflection P pol     (rpr,rpi):  0.051562501470 -0.060163004120
Ray Amplitude Transmission S pol   (tsr,tsi):  0.905689944211 -0.416467258079
Ray Amplitude Transmission P pol   (tpr,tpi):  0.905691069382 -0.416467775728
Ray Reflection Phase               (Prs,Prp): -0.862225505620 -0.862225514680
Ray Reflection Retardance (P-S)         (Sr): -0.000000009059 (-0.000001 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.141592644530 (179.999999 deg)
Ray Transmission Phase             (Pts,Ptp): -0.431001931221 -0.431001931455
Ray Transmission Retardance (P-S)       (St): -0.000000000234 (-0.000000 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141592653356 (180.000000 deg)
Electric field after coating       (Esr,Epr):  0.395657388054  0.728100204747
                                   (Esi,Epi):  0.172608987114  0.480540393186
Ray intensity after coating             (I2):  0.947387608790
Direction cosines of new S vector (sx,sy,sz):  1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000  0.998960962482  0.045574065398
E field after                  (Exr,Eyr,Ezr):  0.395657388054  0.727343681317  0.033182486348
                               (Exi,Eyi,Ezi):  0.172608987114  0.480041093688  0.021900179306
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.431669585625  0.871474774381  0.039757958371
X, Y, and Z direction Phase     (Px, Py, Pz):  0.411368108682  0.583367513658  0.583367513658
Phase difference between X and Y       (Pxy): -0.171999404976 (-9.854840 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.970259426694  0.066359313189
Angle of XY polarization ellipse        (Ap):  1.114479692413 (63.854983 deg)
Ray intensity out                       (I2):  0.947387608790


Tracing ray to surface 11:

Path length through SK16                (tau):  5.8735520E+000
Internal absorption per mm            (alpha):  3.5012798E-004
Internal Transmittance of ray            (IT):  0.997945618210
Propagation Phase Factors             (pc,ps): -0.474009697728 -0.880519622984
Coordinates on surface                (x,y,z):  0.0000000E+000  9.8678924E+000  7.4944839E+001
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.045574065398  0.998960962482
Cosine of angle of incident ray              :  0.981417437307 (11.062805 deg)
Cosine of angle of exit ray                  :  0.950432222624 (18.115395 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.167881983395  0.985807100629
Direction cosines of normal       (ln,mn,nn): -0.000000000000 -0.146958339062 -0.989142682620
Direction cosines of S vector     (sx,sy,sz): -1.000000000000  0.000000000000  0.000000000000
Direction cosines of P vector     (px,py,pz): -0.000000000000 -0.998960962482 -0.045574065398
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.035523293136  0.077837566863  0.003551064051
                               (Exi,Eyi,Ezi): -0.429760300759 -0.867092473590 -0.039558031377
E field before coating (s&p)       (Esr,Epr):  0.035523293136 -0.077918527136
                                   (Esi,Epi):  0.429760300759  0.867994352288
Ray intensity before coating            (I1):  0.945441312938
Coating                                      :  AR
Intensity Reflection coefficients    (Rs,Rp):  0.007815994309  0.005062217192
Intensity Transmission coefficients  (Ts,Tp):  0.992184005691  0.994937782808
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                         (D):  0.001385811948
Field Amplitude Reflection S pol   (rsr,rsi): -0.087269303878 -0.014144359625
Field Amplitude Reflection P pol   (rpr,rpi): -0.070114474368 -0.012090396044
Field Amplitude Transmission S pol (tsr,tsi):  0.041510560995 -0.995219010579
Field Amplitude Transmission P pol (tpr,tpi):  0.041310826504 -0.996609852661
Field Reflection Phase             (Prs,Prp): -2.980912752797 -2.970833985192
Field Reflection Retardance (P-S)       (Sr):  0.010078767605 (0.577471 deg)
Field Reflection Retardance (P-S+pi)    (Sr): -3.131513885985 (-179.422529 deg)
Field Transmission Phase           (Pts,Ptp): -1.529110513552 -1.529368690427
Field Transmission Retardance (P-S)     (St): -0.000258176875 (-0.014792 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141334476715 (179.985208 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.060678232379 -0.064297328280
Ray Amplitude Reflection P pol     (rpr,rpi):  0.049351791117 -0.051250540543
Ray Amplitude Transmission S pol   (tsr,tsi):  0.912749118393 -0.398839632640
Ray Amplitude Transmission P pol   (tpr,tpi):  0.913911750270 -0.399628697076
Ray Reflection Phase               (Prs,Prp): -0.814348501716 -0.804269734112
Ray Reflection Retardance (P-S)         (Sr):  0.010078767605 (0.577471 deg)
Ray Reflection Retardance (P-S+pi)      (Sr): -3.131513885985 (-179.422529 deg)
Ray Transmission Phase             (Pts,Ptp): -0.411961501189 -0.412219678064
Ray Transmission Retardance (P-S)       (St): -0.000258176875 (-0.014792 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141334476715 (179.985208 deg)
Electric field after coating       (Esr,Epr):  0.203829294970  0.275664794561
                                   (Esi,Epi):  0.378095238453  0.824408717201
Ray intensity after coating             (I2):  0.940143202786
Direction cosines of new S vector (sx,sy,sz): -1.000000000000  0.000000000000  0.000000000000
Direction cosines of new P vector (px,py,pz): -0.000000000000 -0.985807100629 -0.167881983395
E field after                  (Exr,Eyr,Ezr): -0.203829294970 -0.271752311872 -0.046279152463
                               (Exi,Eyi,Ezi): -0.378095238453 -0.812707967237 -0.138403370572
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.429537414935  0.856938480300  0.145935783611
X, Y, and Z direction Phase     (Px, Py, Pz): -2.065228730717 -1.893487502617 -1.893487502617
Phase difference between X and Y       (Pxy): -0.171741228101 (-9.840048 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.956304858439  0.065779689673
Angle of XY polarization ellipse        (Ap):  1.109712155595 (63.581823 deg)
Ray intensity out                       (I2):  0.940143202786
```

Tracing ray to surface 12:

```
Path length through air                (tau):  5.8879247E+001
Internal absorption per mm           (alpha):  0.0000000E+000
Internal Transmittance of ray           (IT):  1.000000000000
Propagation Phase Factors             (pc,ps):  0.929209673668  0.369552949335
Coordinates on surface                (x,y,z):  0.0000000E+000 -1.6872411E-002  1.3298842E+002
Direction cosines of incident ray (l1,m1,n1):  0.000000000000 -0.167881983395  0.985807100629
Cosine of angle of incident ray              :  0.985807100629 (9.664696 deg)
Cosine of angle of exit ray                  :  0.985807100629 (9.664696 deg)
Direction cosines of exit ray     (l2,m2,n2):  0.000000000000 -0.167881983395  0.985807100629
Direction cosines of normal       (ln,mn,nn):  0.000000000000  0.000000000000 -1.000000000000
Direction cosines of S vector     (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of P vector     (px,py,pz):  0.000000000000 -0.985807100629 -0.167881983395
E field before coating (xyz)   (Exr,Eyr,Ezr): -0.049673942163  0.047823749207  0.008144337635
                               (Exi,Eyi,Ezi): -0.426655470256 -0.855602973365 -0.145708348089
E field before coating (s&p)       (Esr,Epr):  0.049673942163 -0.048512279103
                                   (Esi,Epi):  0.426655470256  0.867921292937
Ray intensity before coating            (I1):  0.940143202786
Coating                                      :  None defined, assuming bare glass.
Intensity Reflection coefficients    (Rs,Rp):  0.000000000000  0.000000000000
Intensity Transmission coefficients  (Ts,Tp):  1.000000000000  1.000000000000
Intensity Absorption coefficients    (As,Ap):  0.000000000000  0.000000000000
Diattenuation                            (D):  0.000000000000
Field Amplitude Reflection S pol   (rsr,rsi):  0.000000000000  0.000000000000
Field Amplitude Reflection P pol   (rpr,rpi):  0.000000000000  0.000000000000
Field Amplitude Transmission S pol (tsr,tsi):  1.000000000000 -0.000000000000
Field Amplitude Transmission P pol (tpr,tpi):  1.000000000000 -0.000000000000
Field Reflection Phase             (Prs,Prp):  0.000000000000  0.000000000000
Field Reflection Retardance (P-S)       (Sr):  0.000000000000 (0.000000 deg)
Field Reflection Retardance (P-S+pi)    (Sr):  3.141592653590 (180.000000 deg)
Field Transmission Phase           (Pts,Ptp): -0.000000000000 -0.000000000000
Field Transmission Retardance (P-S)     (St):  0.000000000000 (0.000000 deg)
Field Transmission Retardance (P-S+pi)  (St):  3.141592653590 (180.000000 deg)
Ray Amplitude Reflection S pol     (rsr,rsi):  0.000000000000  0.000000000000
Ray Amplitude Reflection P pol     (rpr,rpi):  0.000000000000  0.000000000000
Ray Amplitude Transmission S pol   (tsr,tsi):  1.000000000000  0.000000000000
Ray Amplitude Transmission P pol   (tpr,tpi):  1.000000000000  0.000000000000
Ray Reflection Phase               (Prs,Prp):  0.000000000000  0.000000000000
Ray Reflection Retardance (P-S)         (Sr):  0.000000000000 (0.000000 deg)
Ray Reflection Retardance (P-S+pi)      (Sr):  3.141592653590 (180.000000 deg)
Ray Transmission Phase             (Pts,Ptp):  0.000000000000  0.000000000000
Ray Transmission Retardance (P-S)       (St):  0.000000000000 (0.000000 deg)
Ray Transmission Retardance (P-S+pi)    (St):  3.141592653590 (180.000000 deg)
Electric field after coating       (Esr,Epr):  0.049673942163 -0.048512279103
                                   (Esi,Epi):  0.426655470256  0.867921292937
Ray intensity after coating             (I2):  0.940143202786
Direction cosines of new S vector (sx,sy,sz): -1.000000000000 -0.000000000000 -0.000000000000
Direction cosines of new P vector (px,py,pz):  0.000000000000 -0.985807100629 -0.167881983395
E field after                  (Exr,Eyr,Ezr): -0.049673942163  0.047823749207  0.008144337635
                               (Exi,Eyi,Ezi): -0.426655470256 -0.855602973365 -0.145708348089
X, Y, and Z direction Amplitude (Ax, Ay, Az):  0.429537414935  0.856938480300  0.145935783611
X, Y, and Z direction Phase     (Px, Py, Pz): -1.686700864569 -1.514959636468 -1.514959636468
Phase difference between X and Y       (Pxy): -0.171741228101 (-9.840048 deg)
Major, Minor semi axis XY ellipse   (EM, Em):  0.956304858439  0.065779689673
Angle of XY polarization ellipse        (Ap):  1.109712155595 (63.581823 deg)
Ray intensity out                       (I2):  0.940143202786
SUMMARY

Total transmitted intensity:  0.940143202786
```