# Chief ray boresight-focal plane angle

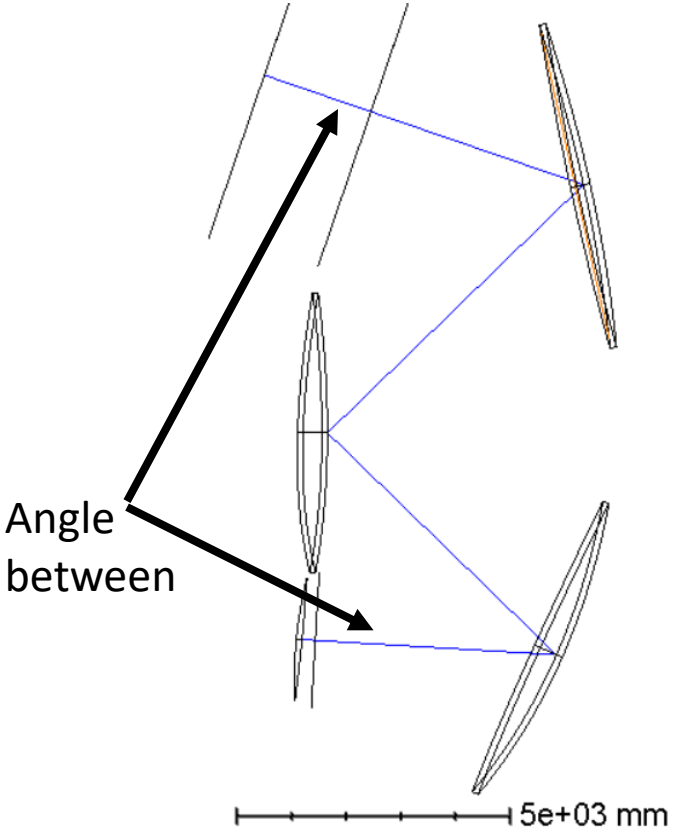
- For the boresight, take chief ray direction in global coordinates before primary (u)
- Take chief direction ray at focal plane (v)
- Angle=arccos(u dot v)
- Test with merit function, script it for future use (see github).

| | Type | Op# | Flag | | | | | Target | Weight | Value | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | RAGA | 5 | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 2 | RAGB | 5 | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | -0.324 | |
| 3 | RAGC | 5 | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.946 | |
| 4 | BLNK | | | | | | | | | | |
| 5 | RAGA | 34 | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 6 | RAGB | 34 | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | -0.059 | |
| 7 | RAGC | 34 | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.998 | |
| 8 | BLNK | | | | | | | | | | |
| 9 | PROD | 1 | 5 | | | | | 0.000 | 0.000 | 0.000 | |
| 10 | PROD | 2 | 6 | | | | | 0.000 | 0.000 | 0.019 | |
| 11 | PROD | 3 | 7 | | | | | 0.000 | 0.000 | 0.944 | |
| 12 | BLNK | | | | | | | | | | |
| 13 | SUMM | 10 | 11 | | | | | 0.000 | 0.000 | 0.963 | |
| 14 | ACOS | 13 | 1 | | | | | 0.000 | 0.000 | 15.529 | |

7: Text Viewer 2

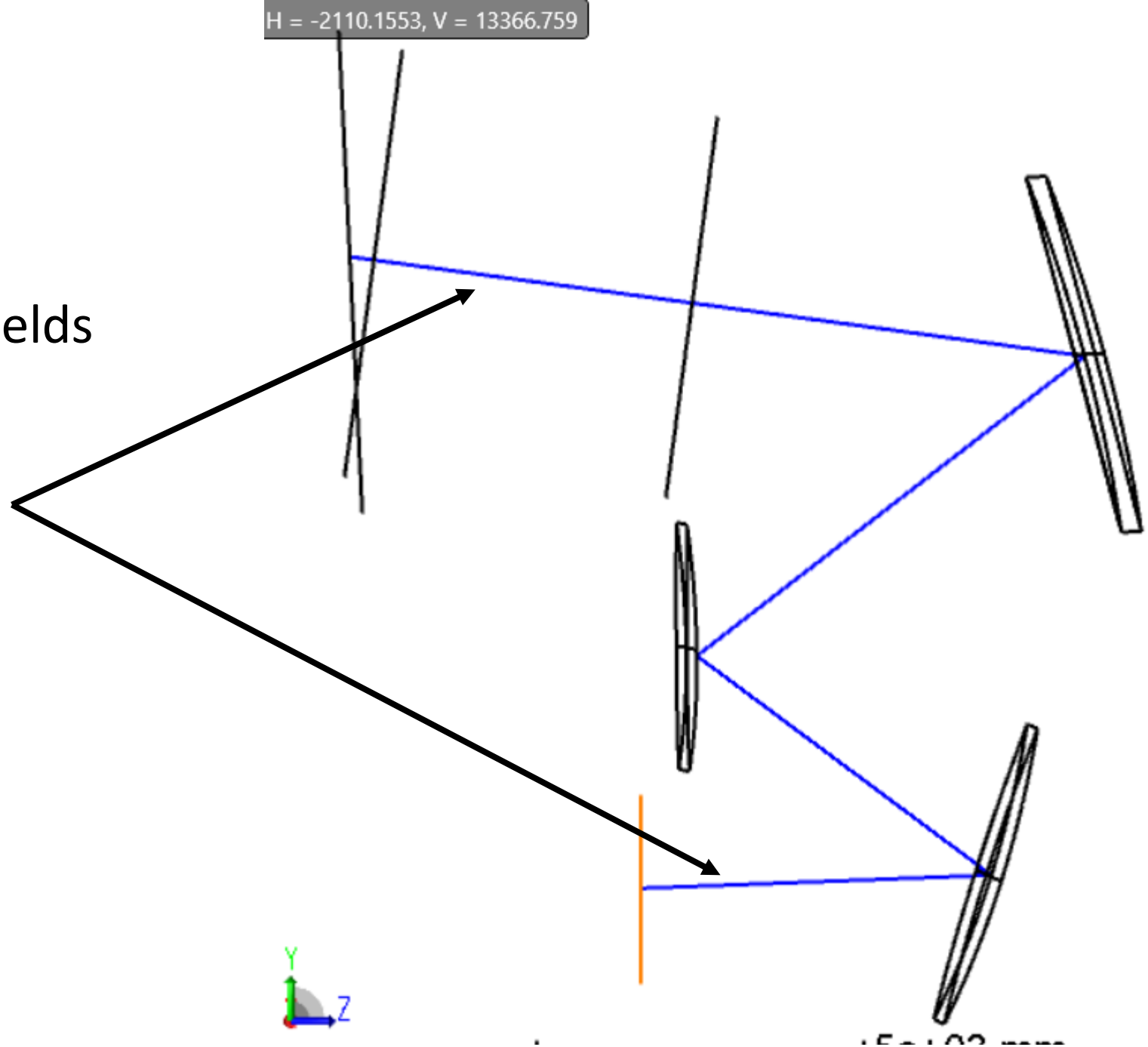
Settings 3 x 4 Standard

```
Executing C:\Users\pgall\Documents\Zemax\MACROS\extract_angle_be
l1 0.0000
m1 -0.3245
n1 0.9459
l2 0.0000
m2 -0.0594
n2 0.9982
cos theta = 0.9635
Angle is 15.5290
```



# SP TMA

- Special case, off axis fields
- Evaluate explicitly
- Angle is 9.95 degrees



# F/# options

| f/# | Boresight-focal plane angle [deg] |
|---|---|
| 3.7 SP TMA | 9.95 |
| 2.5 | 15.5 |
| 2.8 | 13.6 |
| 3.1 | 16.5 |
| 3.3 | 20.4 |
| 3.6 | 15.5 |
| 3.25 | 14.4 |
| 3.0 | 17.5 |
| 3.15 | 12.9 |
| | |