

Report 06/08/2020

P. Hacker

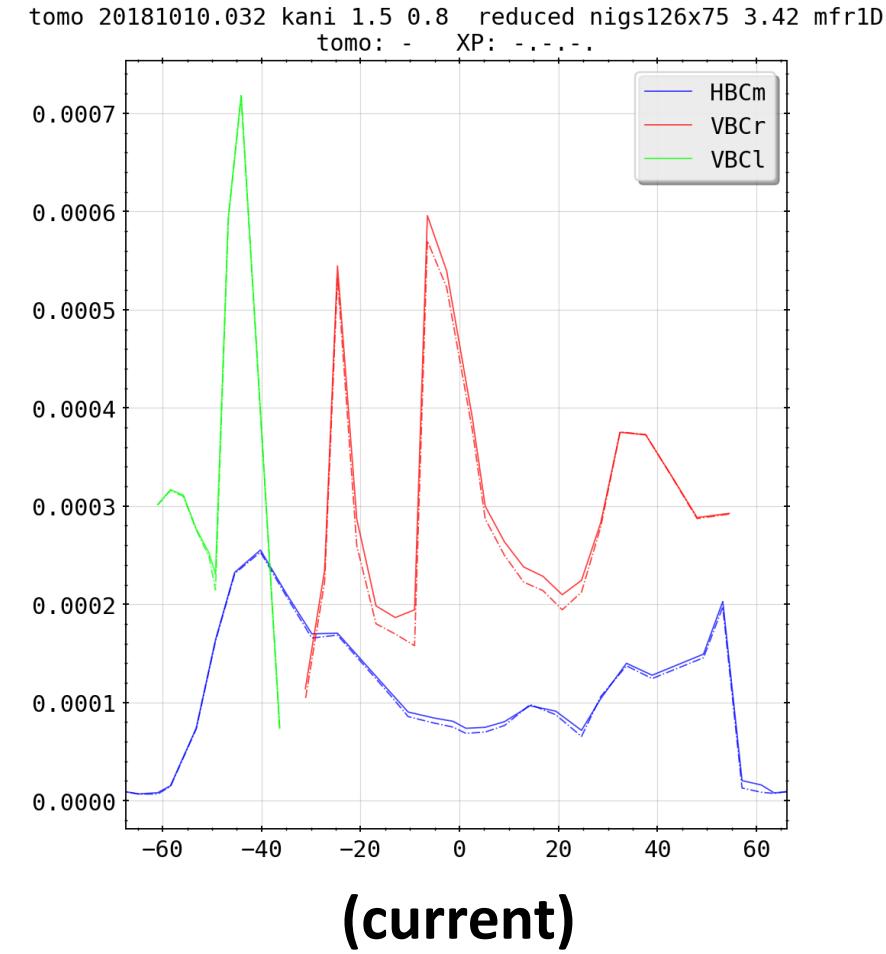
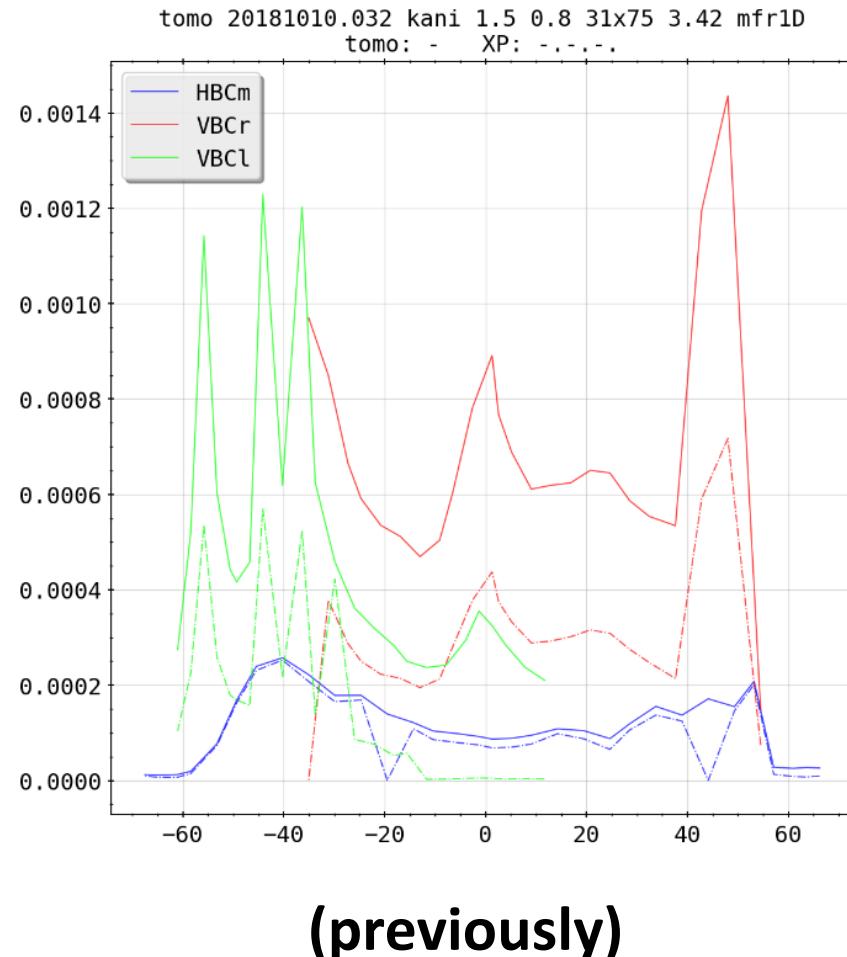


Improvement on Reconstruction and Chordal Profiles

- forward and backward calculation now using the emissivity matrices themselves, instead of channel geometries individually, hence calculating directly to and from the tomogram/phantom
- comparing to input chordal profiles rather than archived ones
- also found error in channel selection and mapping that cause restrictions to zero where no data has been provided or excluded
- deleted broken and unusable channels from script

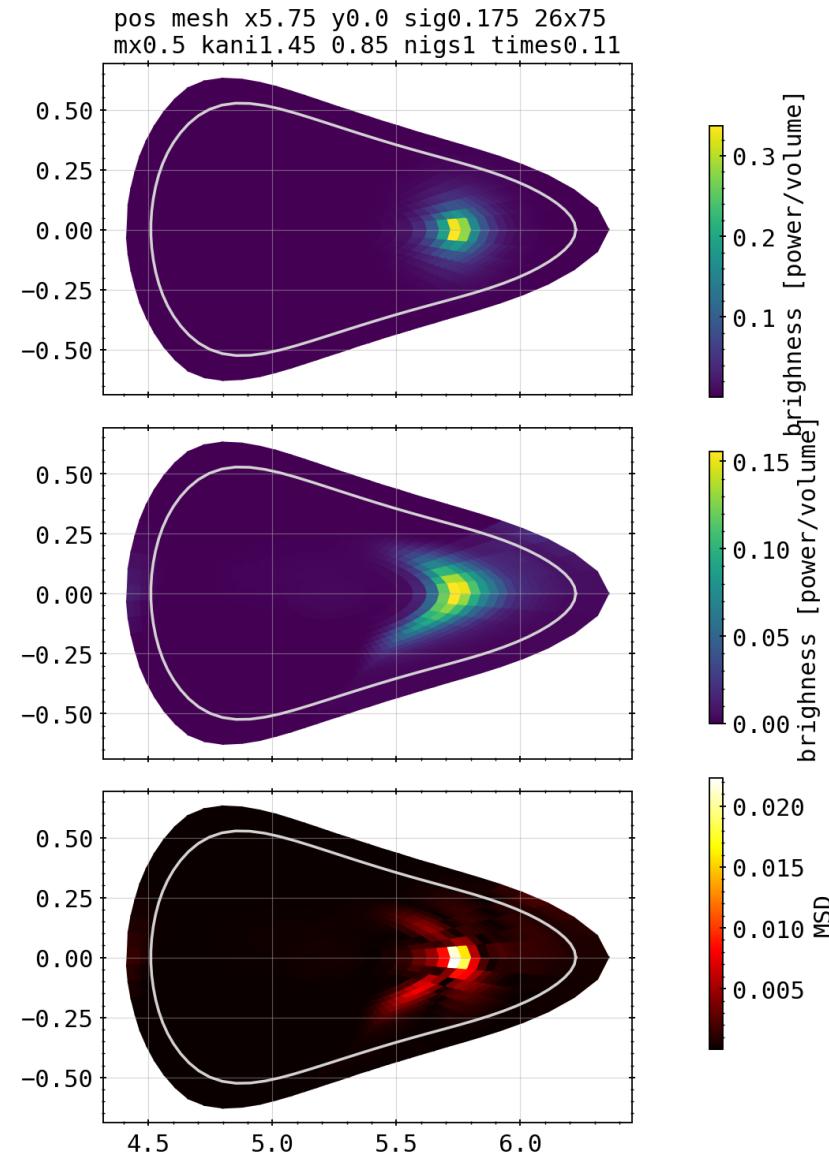
```
46
47     def forward_integral(
48         channels={'none': None},
49         data=np.zeros((33 * 51)),
50         emissivity=[np.zeros((32, 33 * 51))],
51         reduced=True,
52         debug=False):
53         chord = np.zeros((128))
54         for n, cam in enumerate(['HBCm', 'VBCl', 'VBCr']):
55             if reduced:
56                 nCh = channels['reduced']['eChannels'][cam]
57             else:
58                 nCh = channels['full']['eChannels'][cam]
59             tm2D = emissivity[n]
60             forward = tm2D.dot(data)
61             if debug:
62                 print(np.shape(forward), np.shape(nCh))
63
64             for c, ch in enumerate(nCh):
65                 if debug:
66                     print('2', cam, c, ch)
67                 chord[ch] = forward[c]
68
69     return (chord)
```

Improvement on Reconstruction and Chordal Profiles



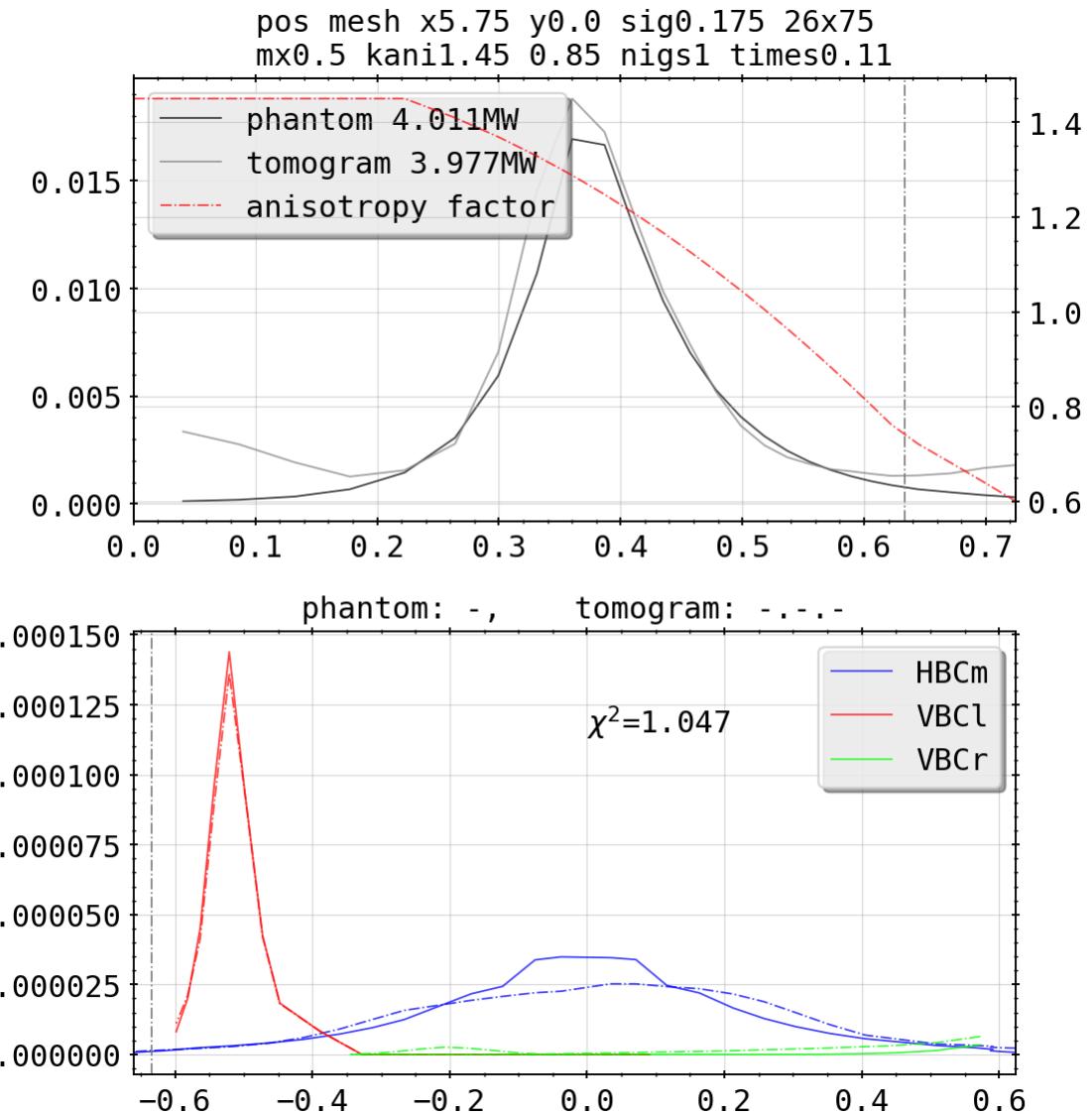
Revisiting: Phantom Tests with Anisotropy Tests

- forward and backward calculation from tomogram/phantom with MSD (mean square deviation) error and χ^2 measurement
- for different phantoms and same geometry scanning the core and edge weighting factor for emissivity matrices



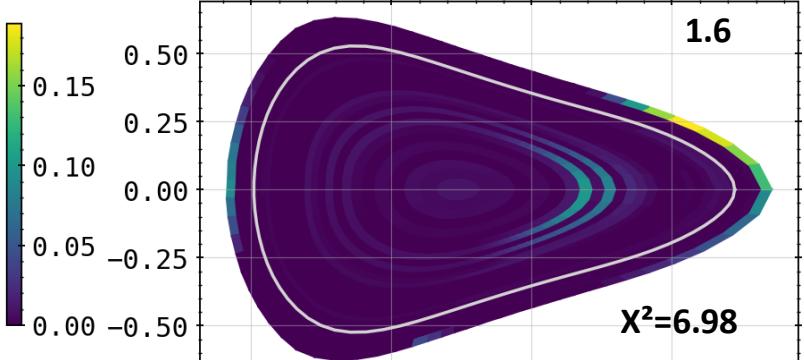
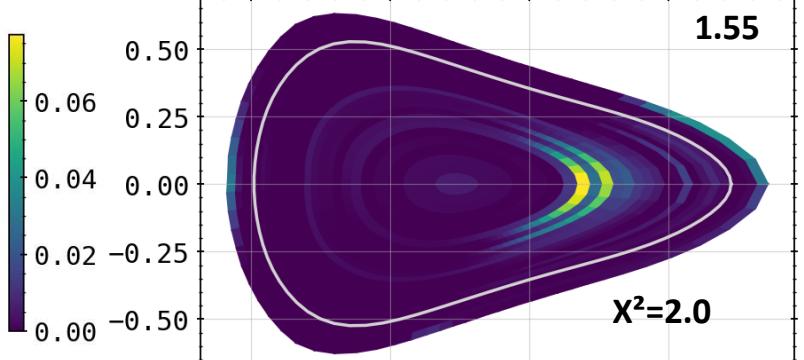
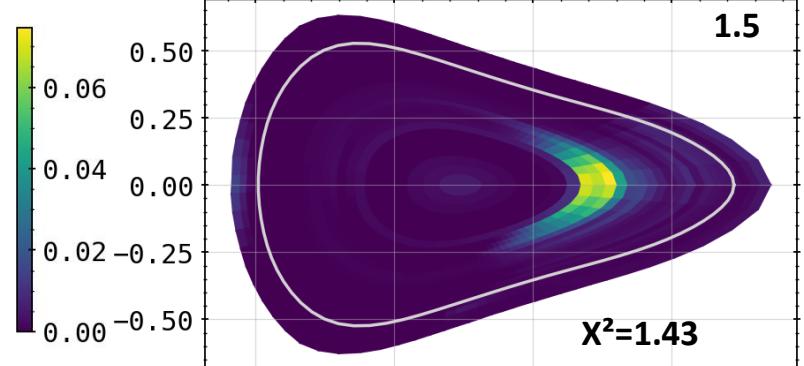
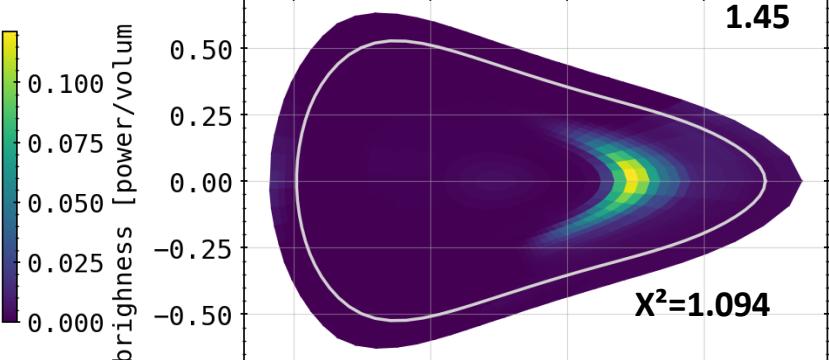
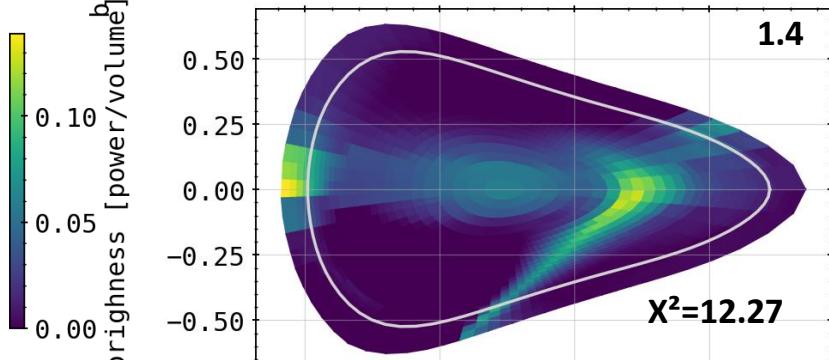
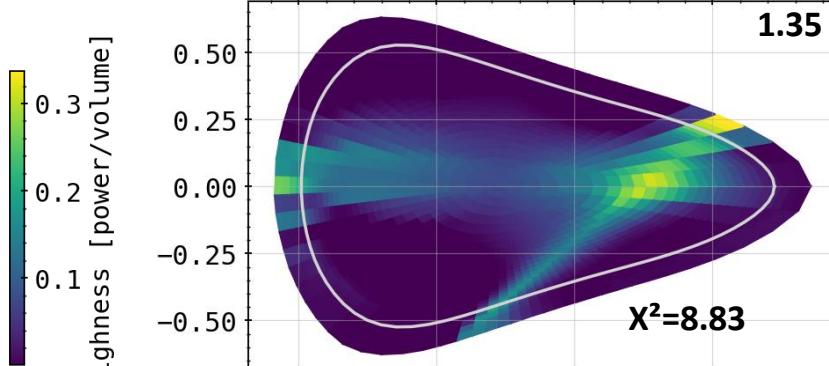
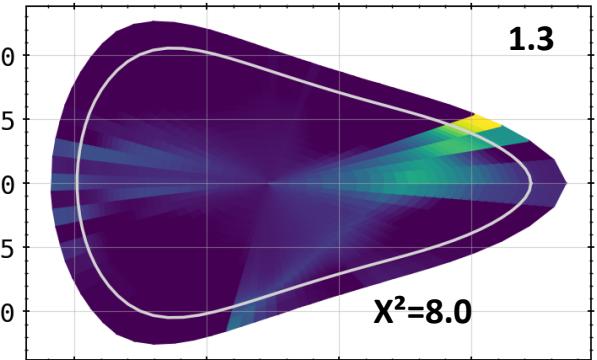
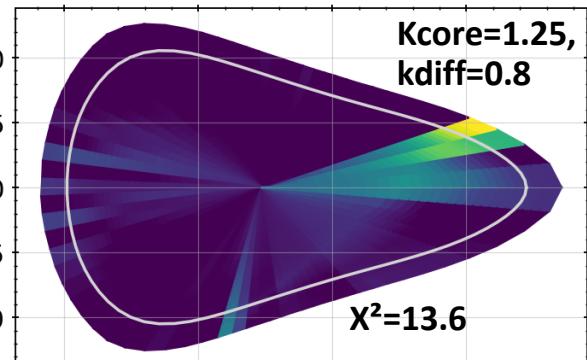
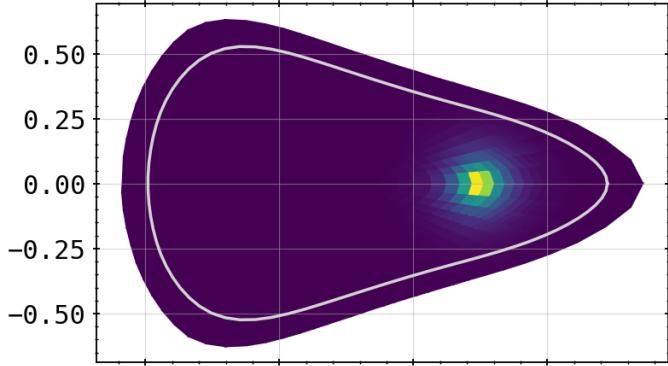
Revisiting: Phantom Tests with Anisotropy Tests

- forward and backward calculation from tomogram/phantom with MSD (mean square deviation) error and χ^2 measurement
- for different phantoms and same geometry scanning the core and edge weighting factor for emissivity matrices
- evaluating χ^2 , MSD for every test individually, aiming for best reconstruction of the phantom



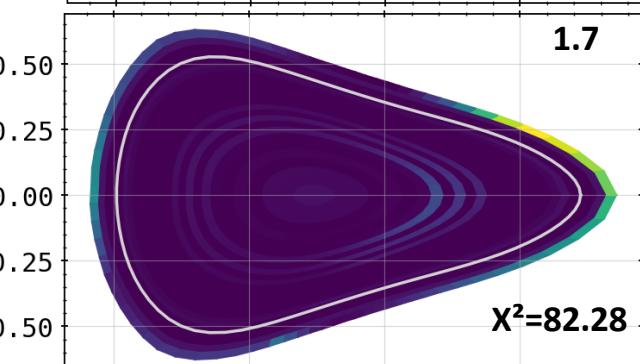
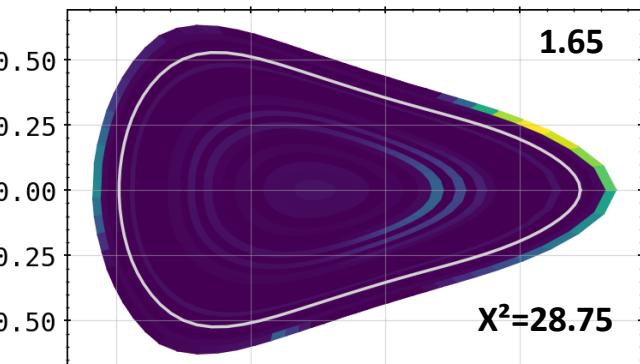
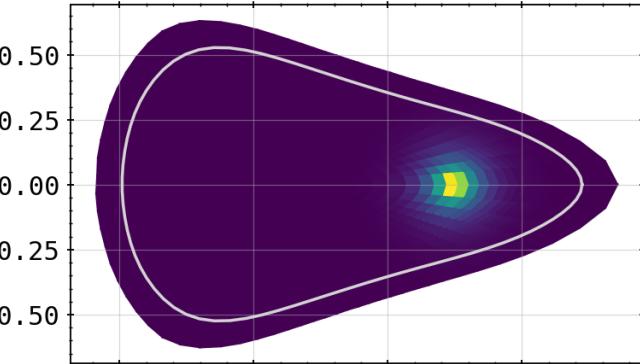
Phantoms: Asymmetric Spot Core Scan

pos mesh x5.75 y0.0 sig0.175 26x75
mx0.5 nigs1 times0.11

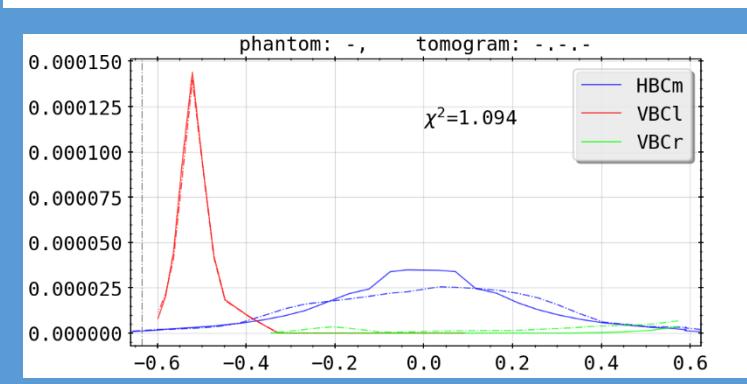
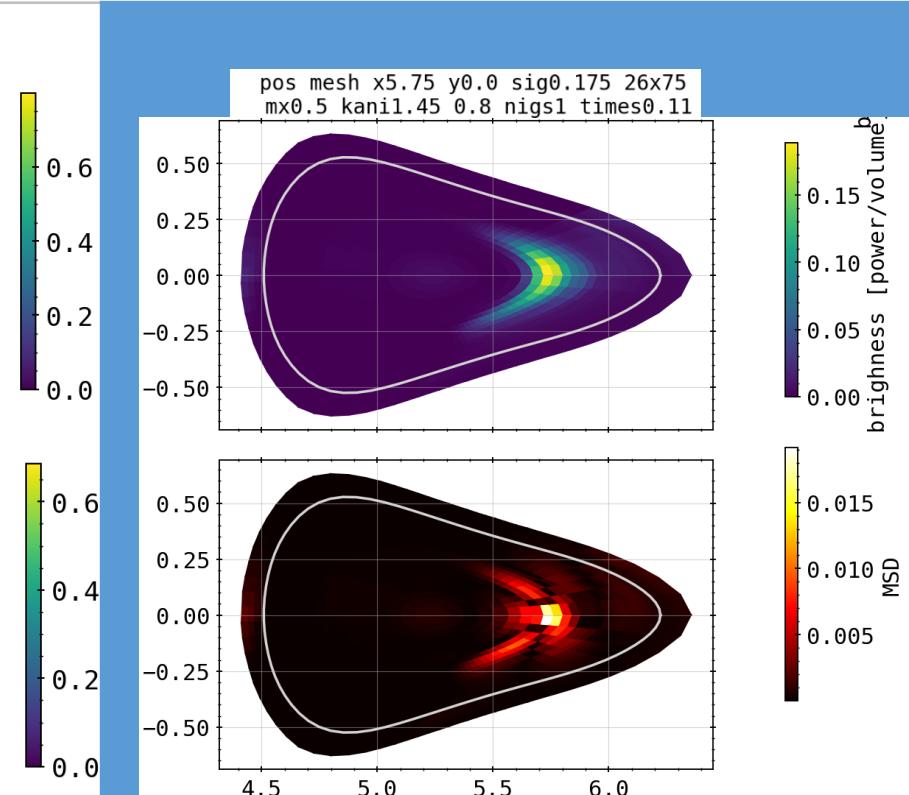
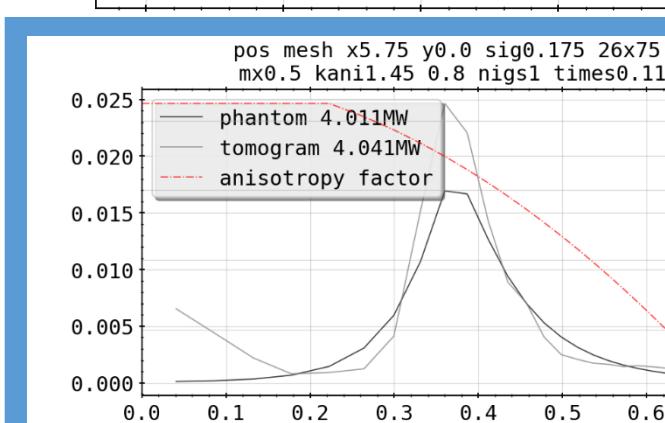
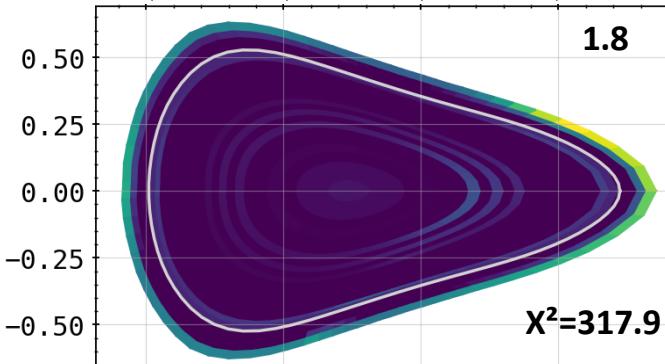
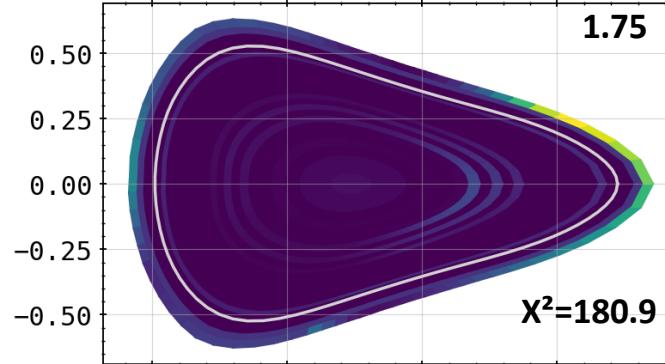


Phantoms: Asymmetric Spot Core Scan

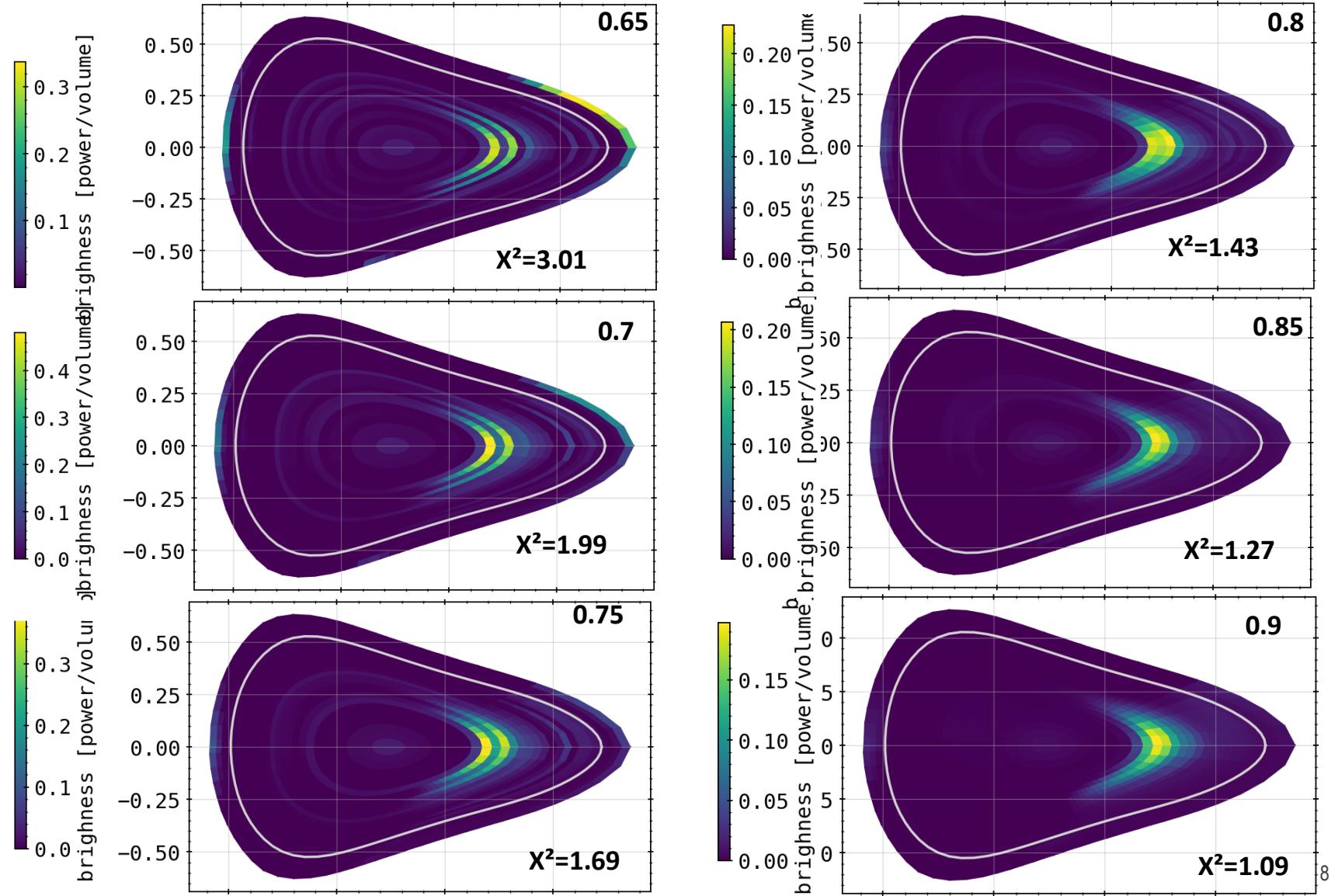
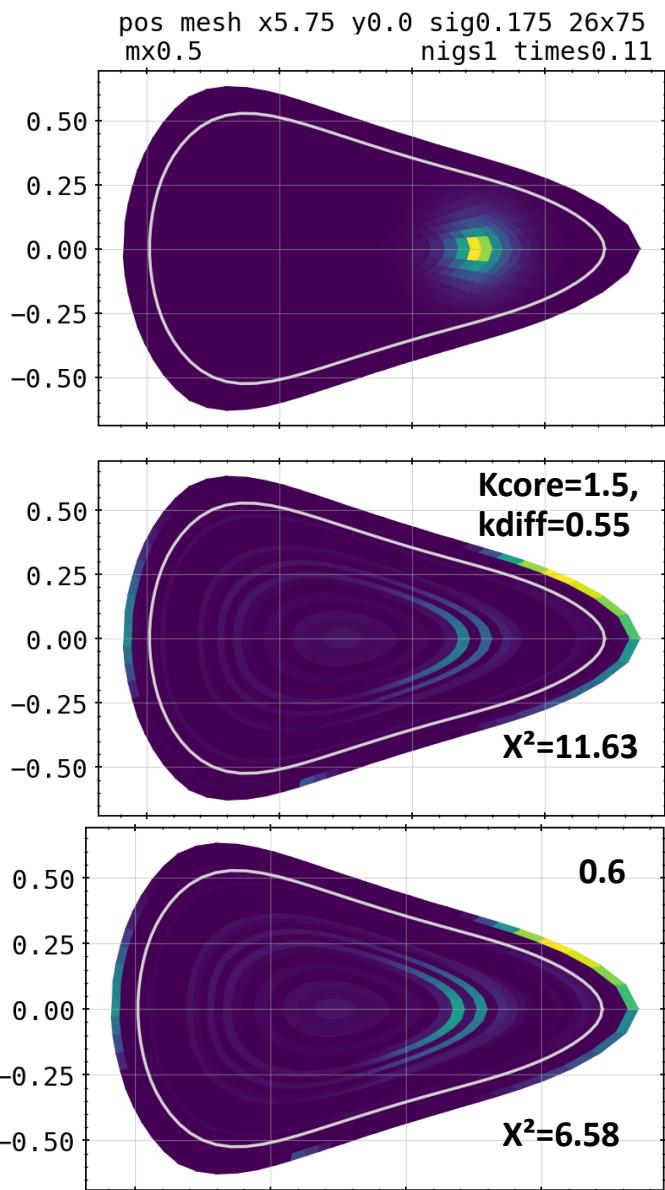
pos mesh x5.75 y0.0 sig0.175 26x75
mx0.5 nigs1 times0.11



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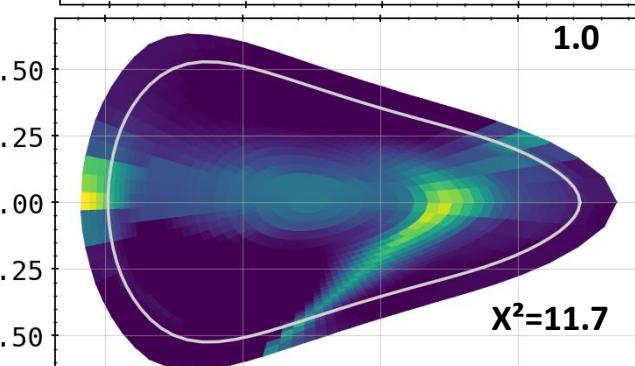
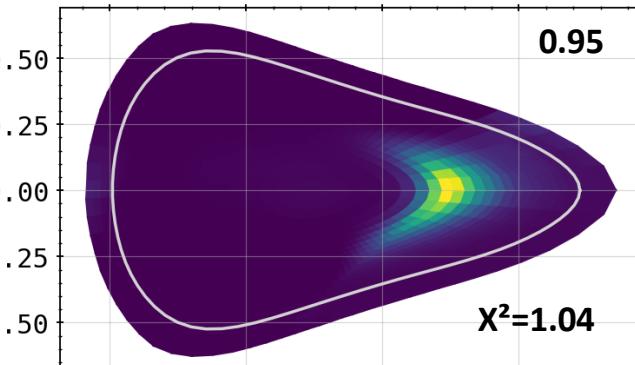
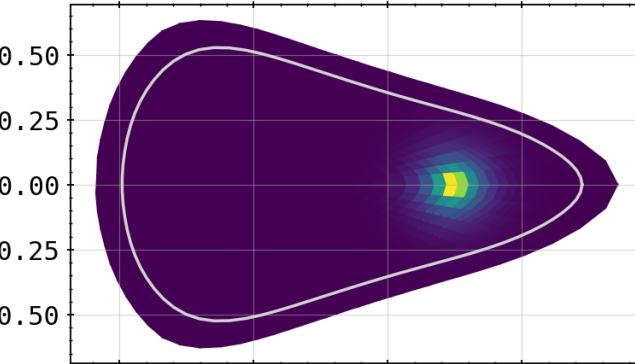


Phantoms: Asymmetric Spot Edge Scan



Phantoms: Asymmetric Spot Core Scan

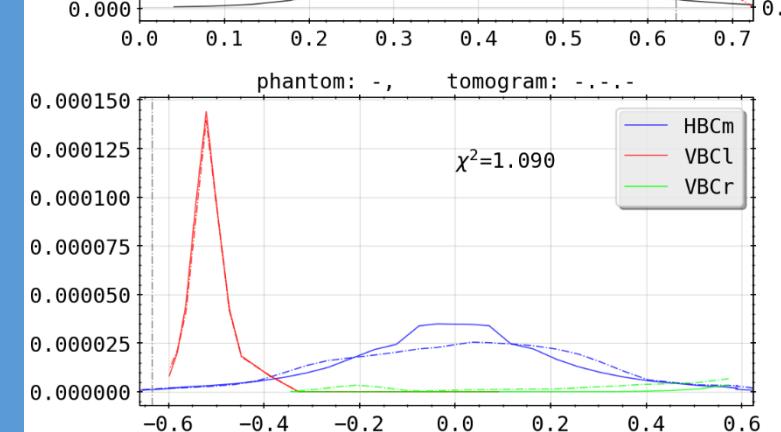
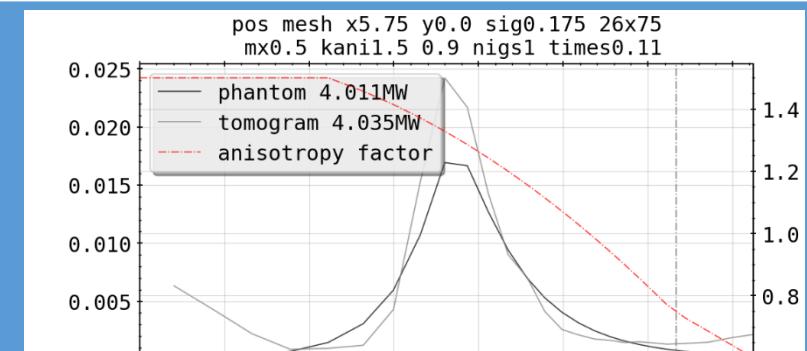
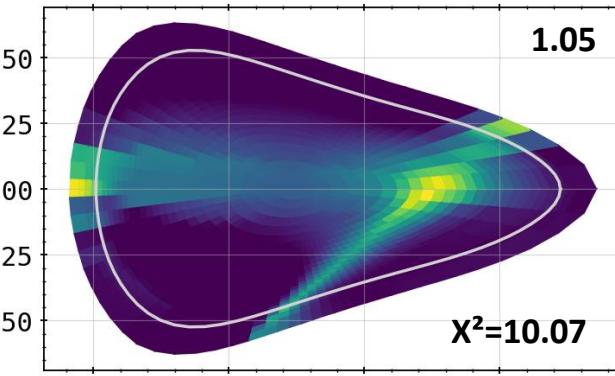
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mx0.5 1 nigs1 times0.11



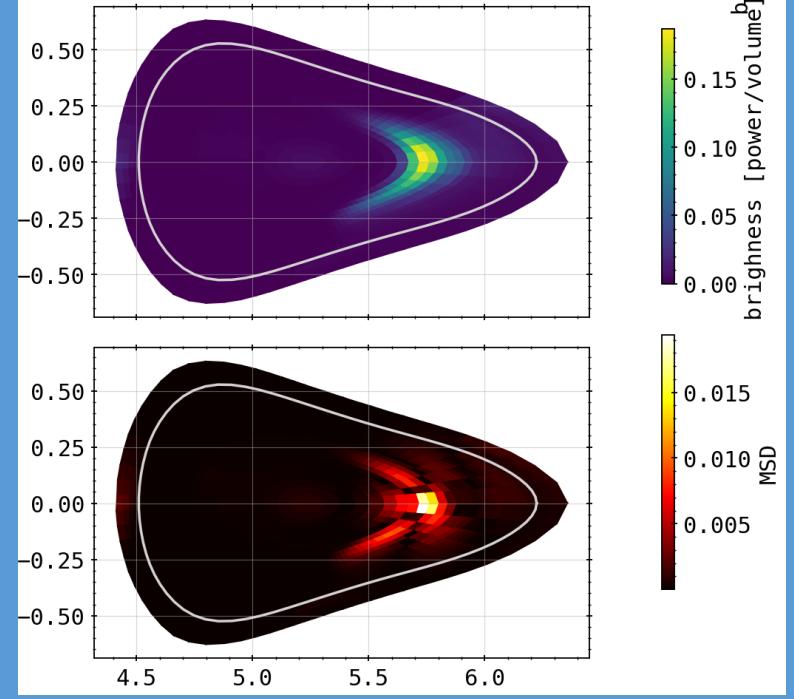
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brightness [power/volume]

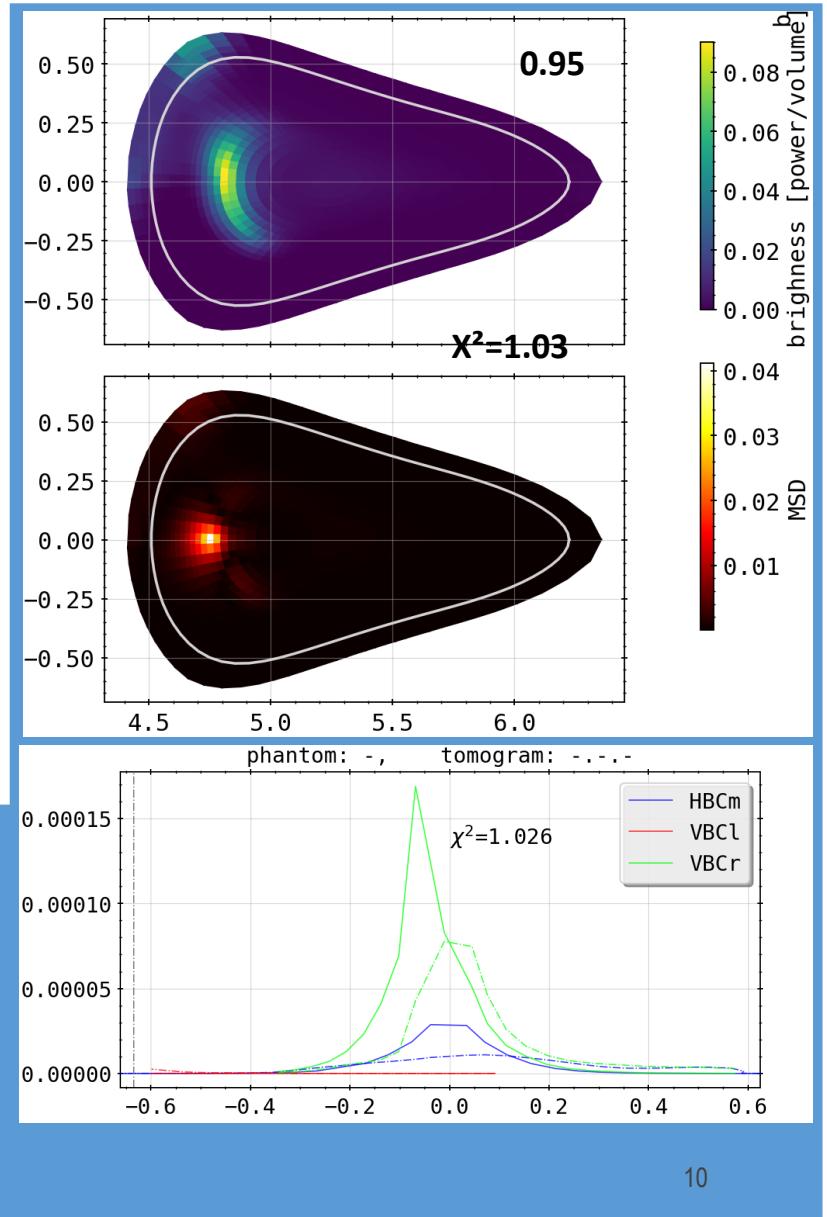
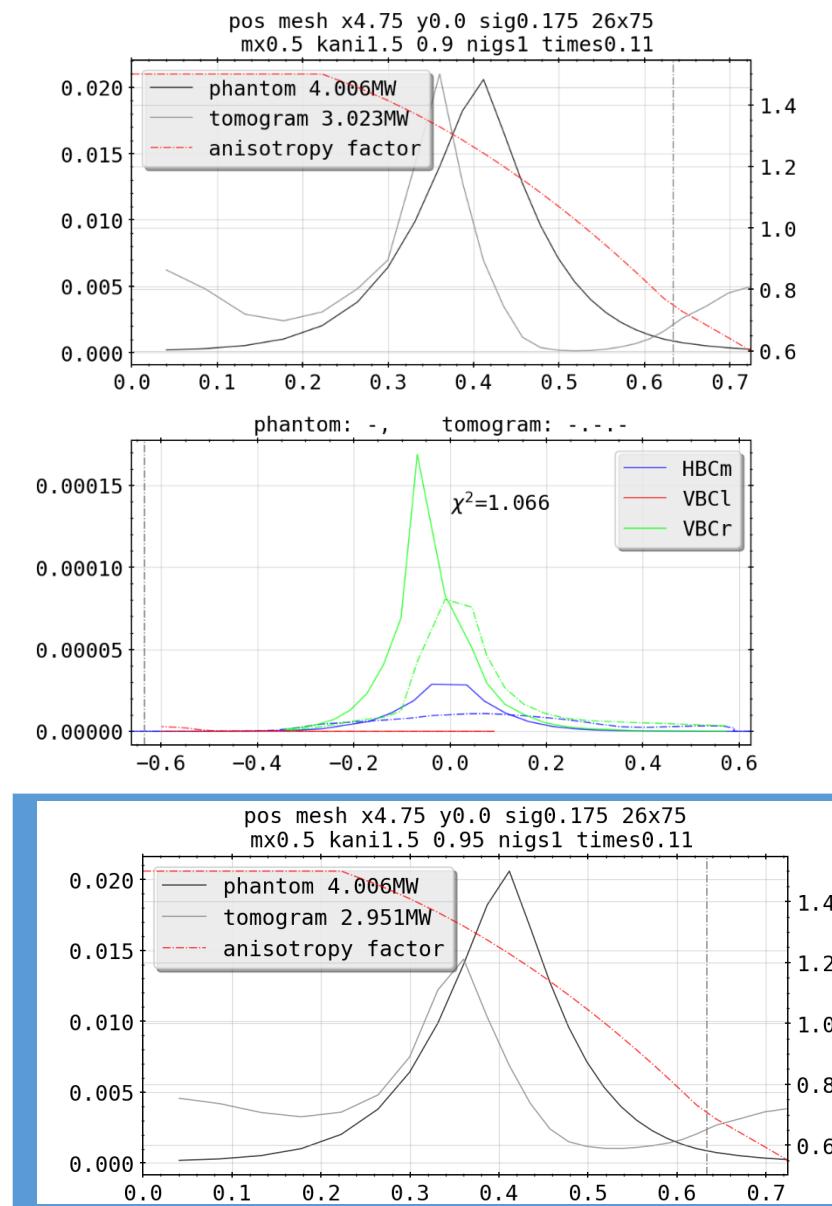
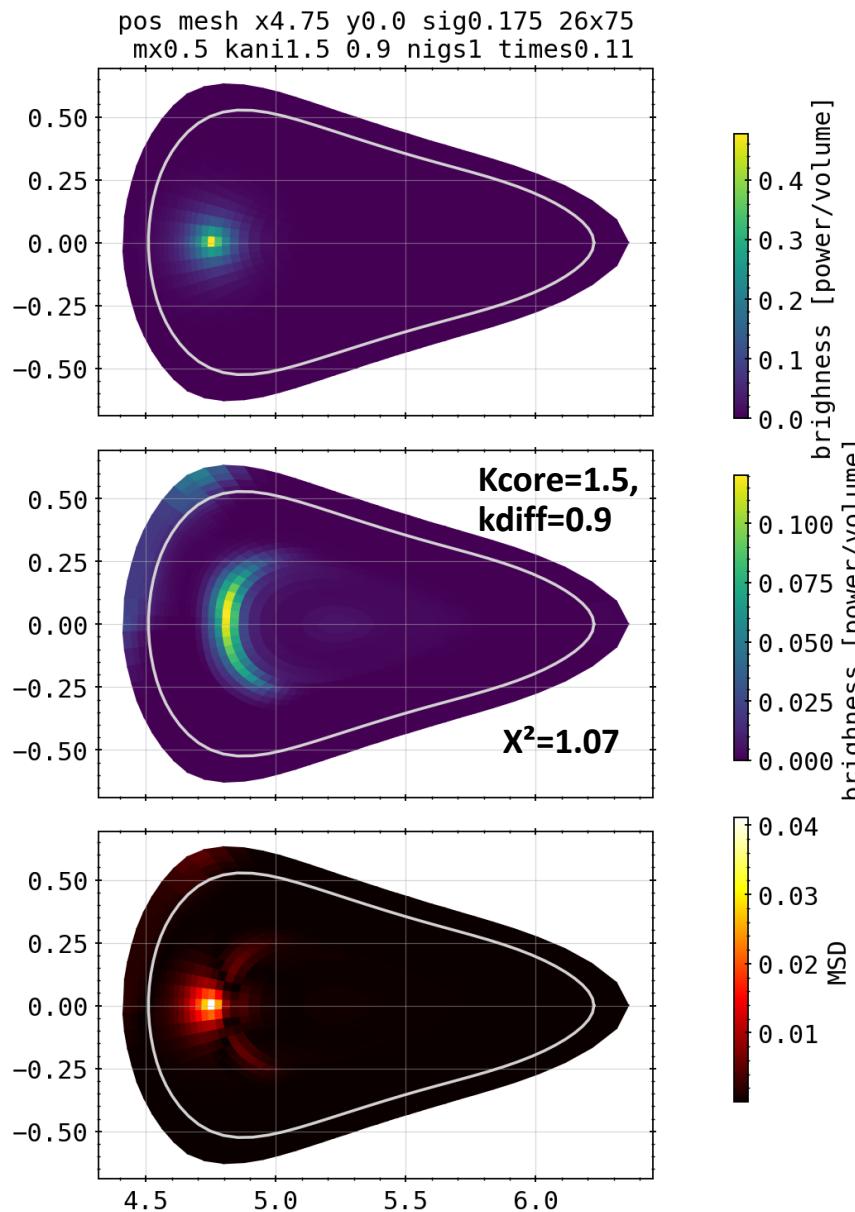
brightness [power/volume]



brightness [power/volume]

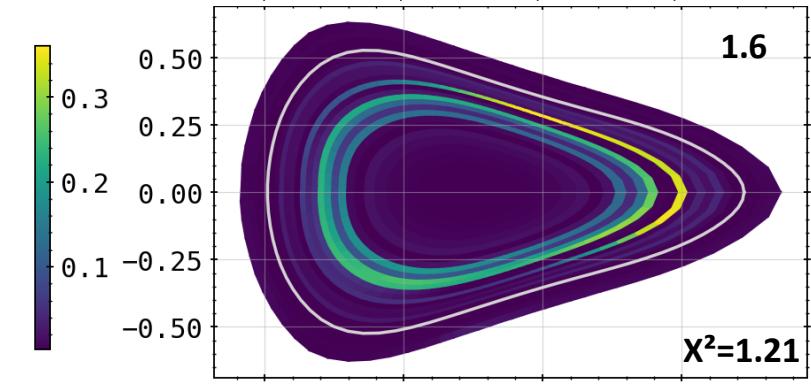
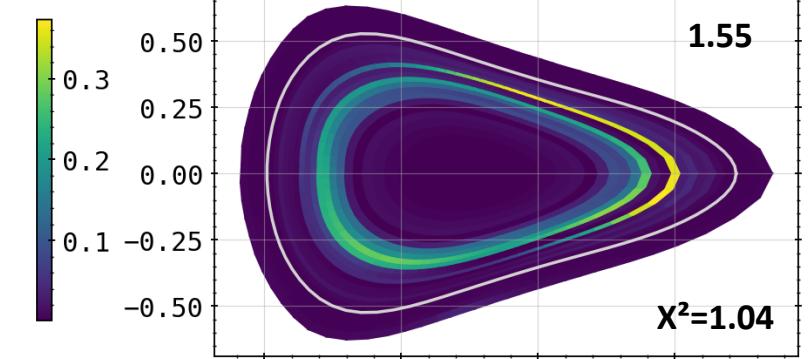
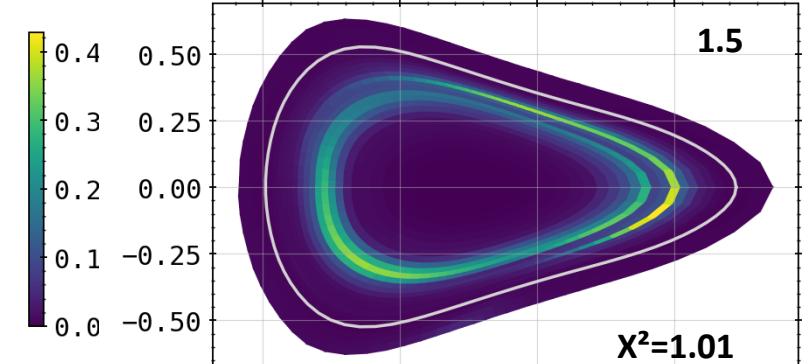
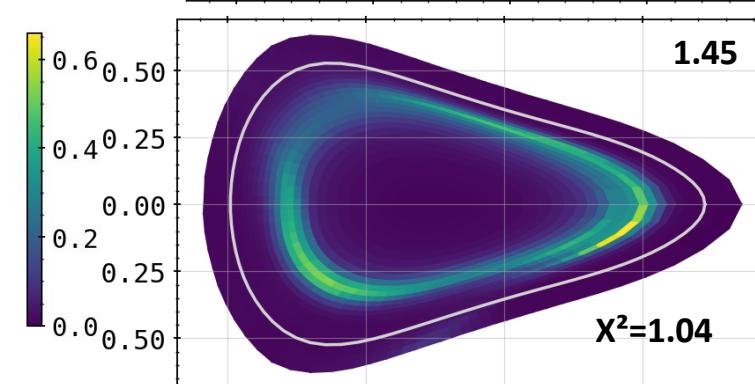
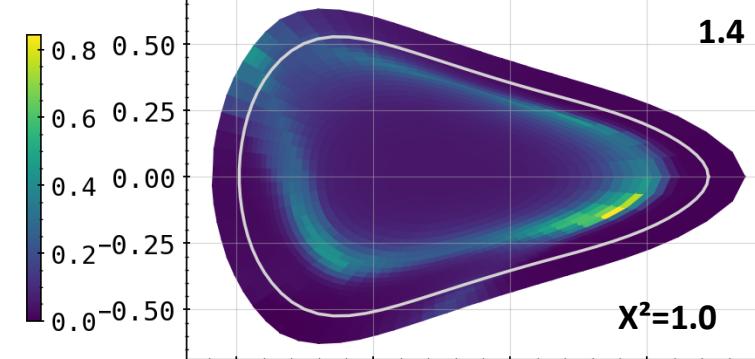
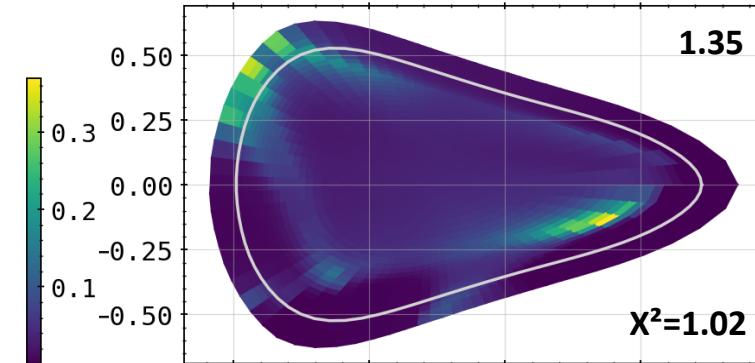
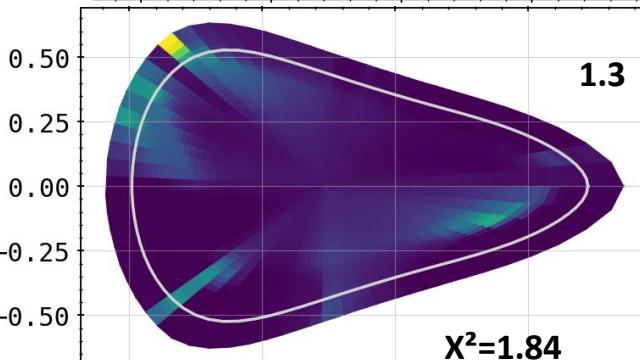
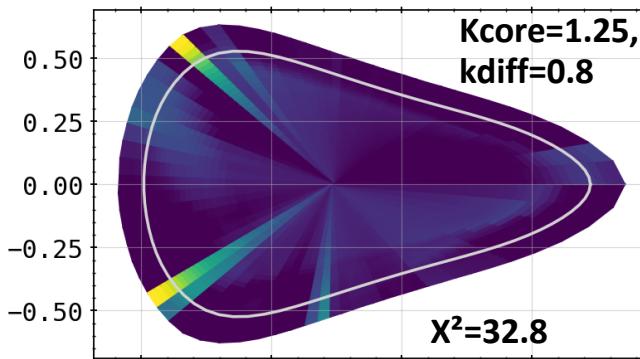
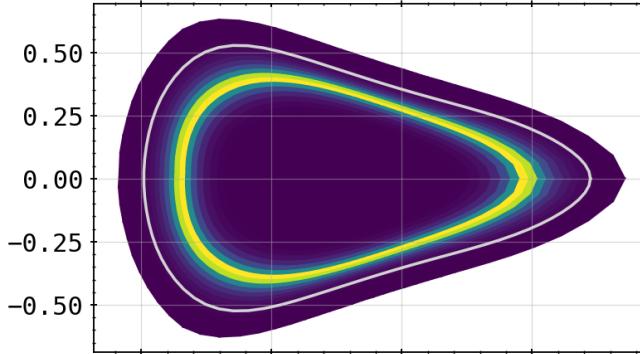


Phantoms: Asymmetric Spot (Flipped) Edge Scan

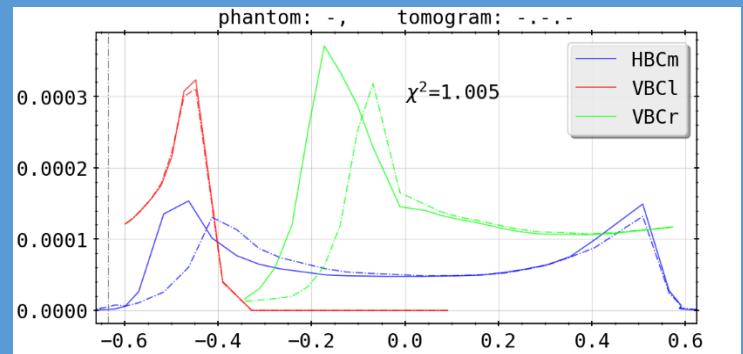
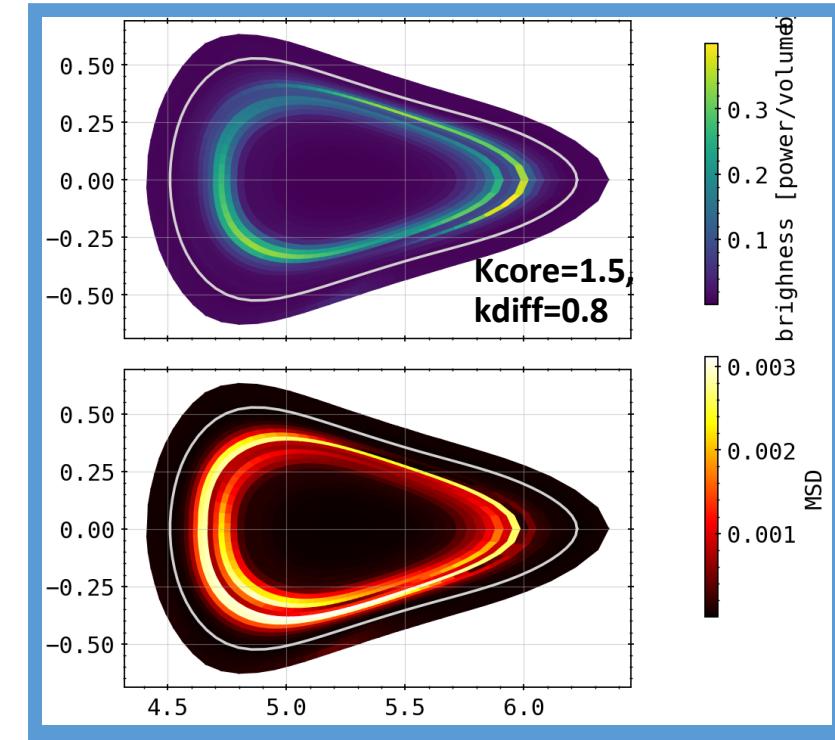
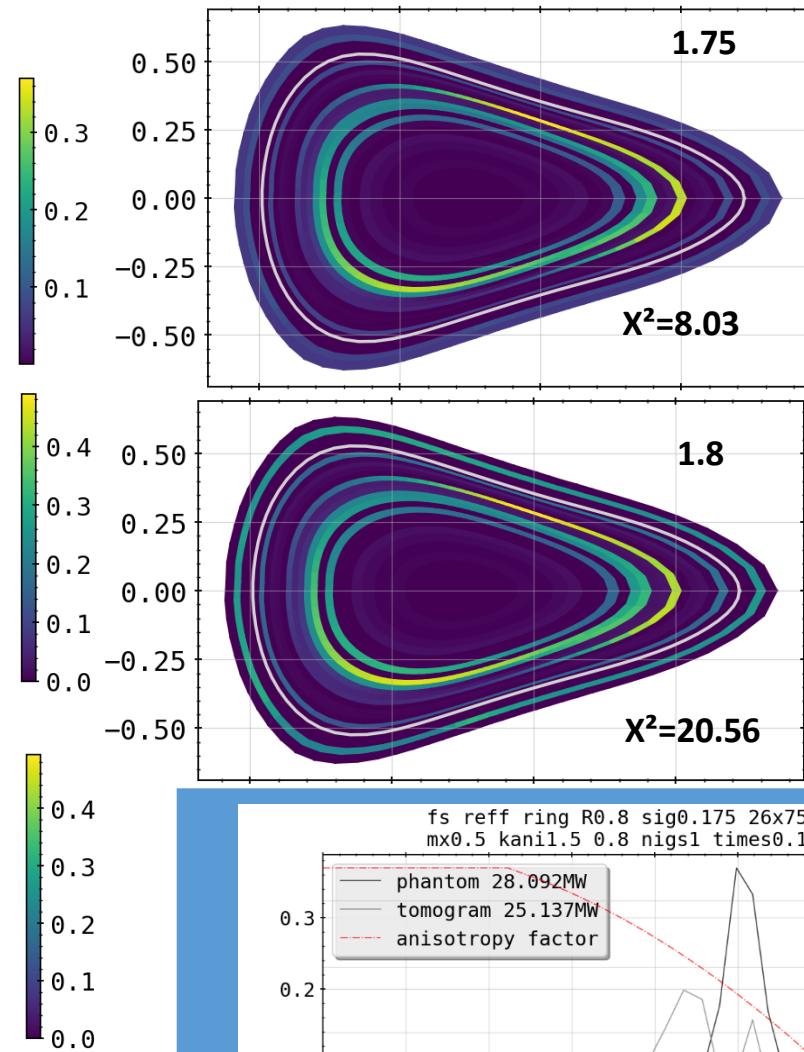
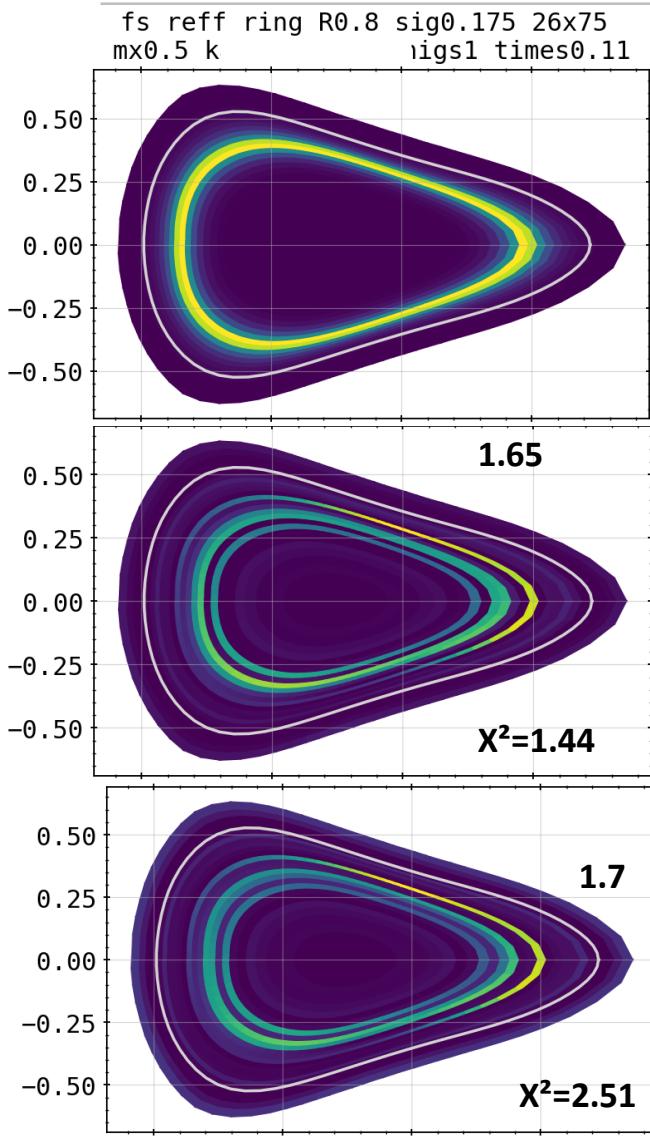


Phantoms: Ring inside LCFS Core Scan

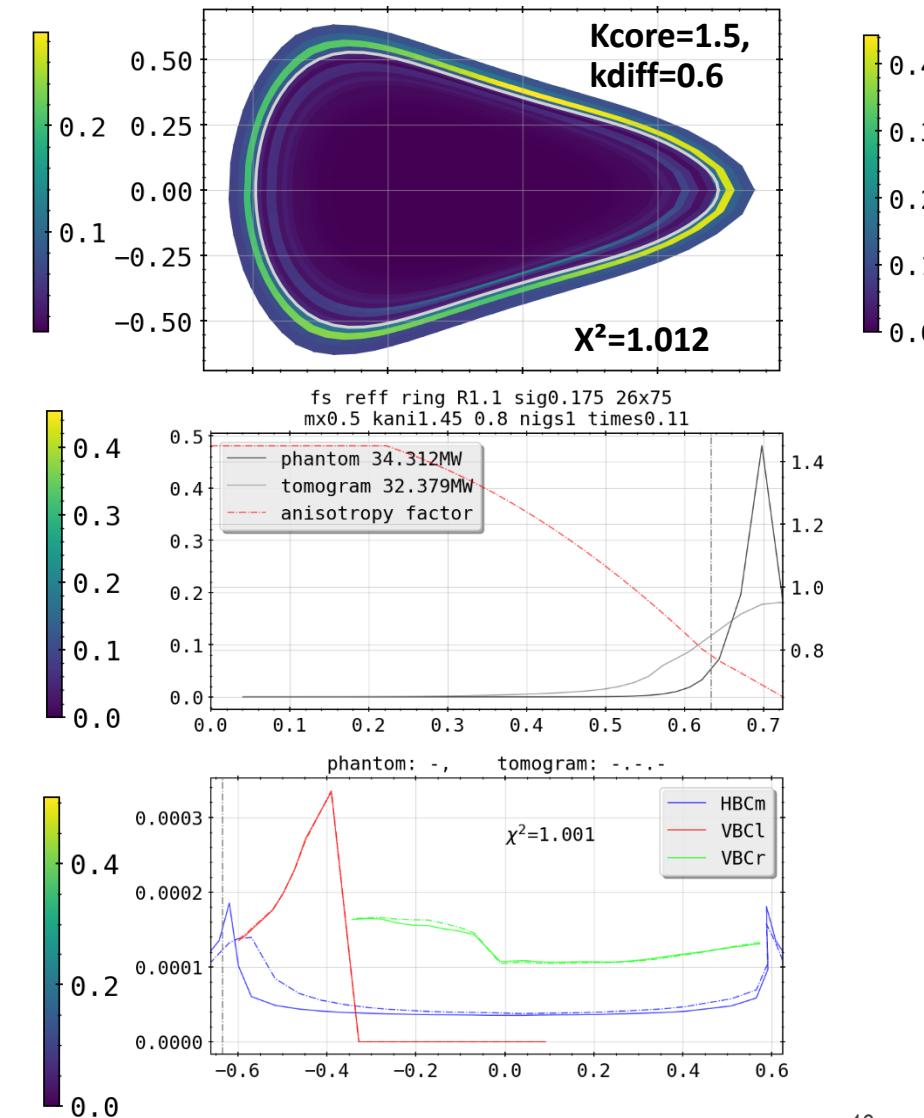
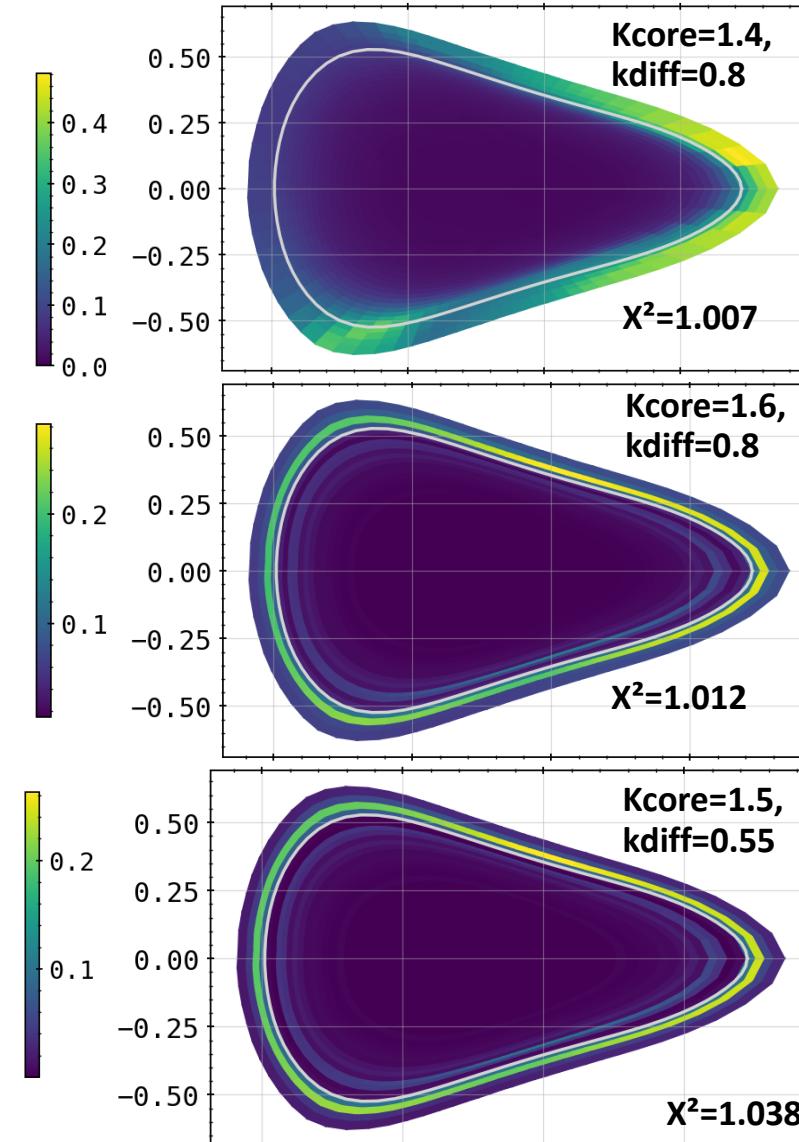
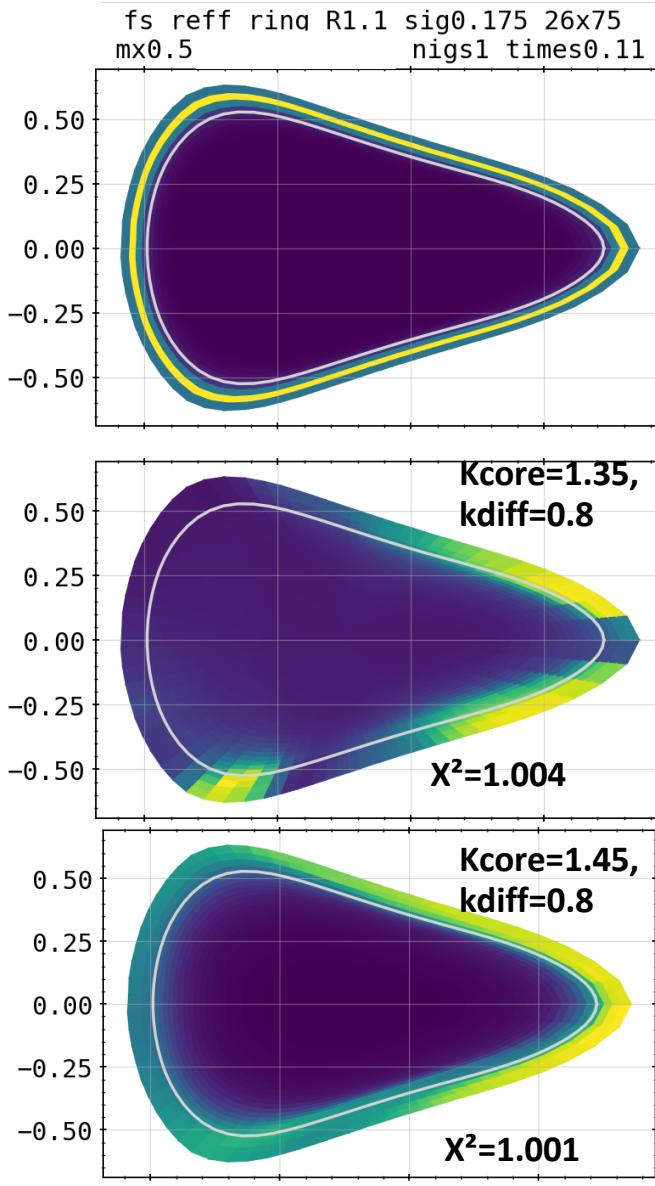
fs reff rina R0.8 sig0.175 26x75
mx0.5 nigs1 times0.11



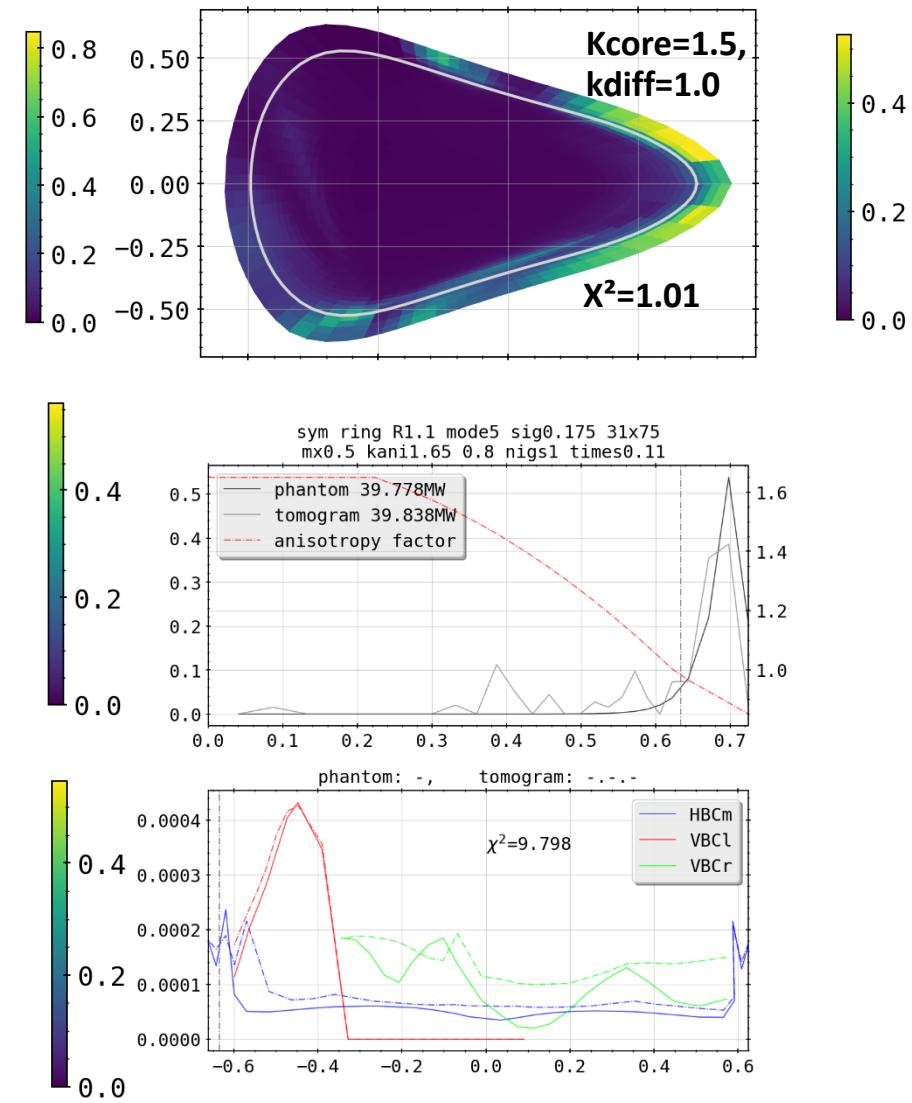
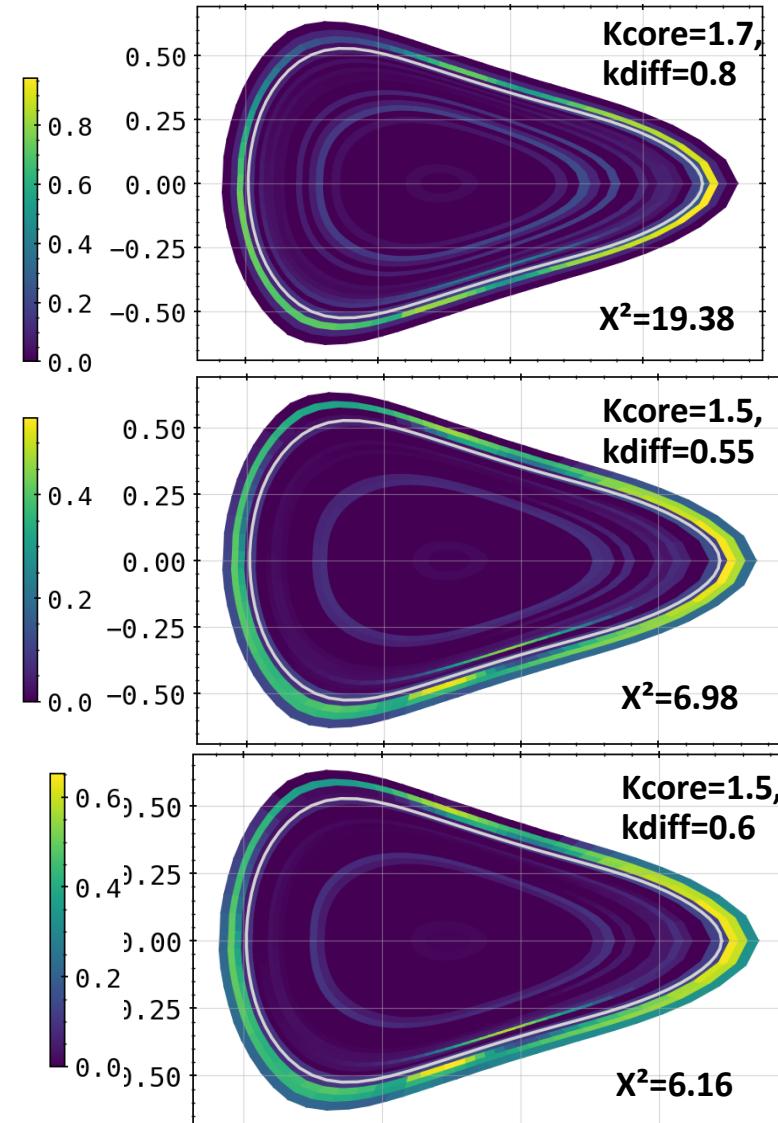
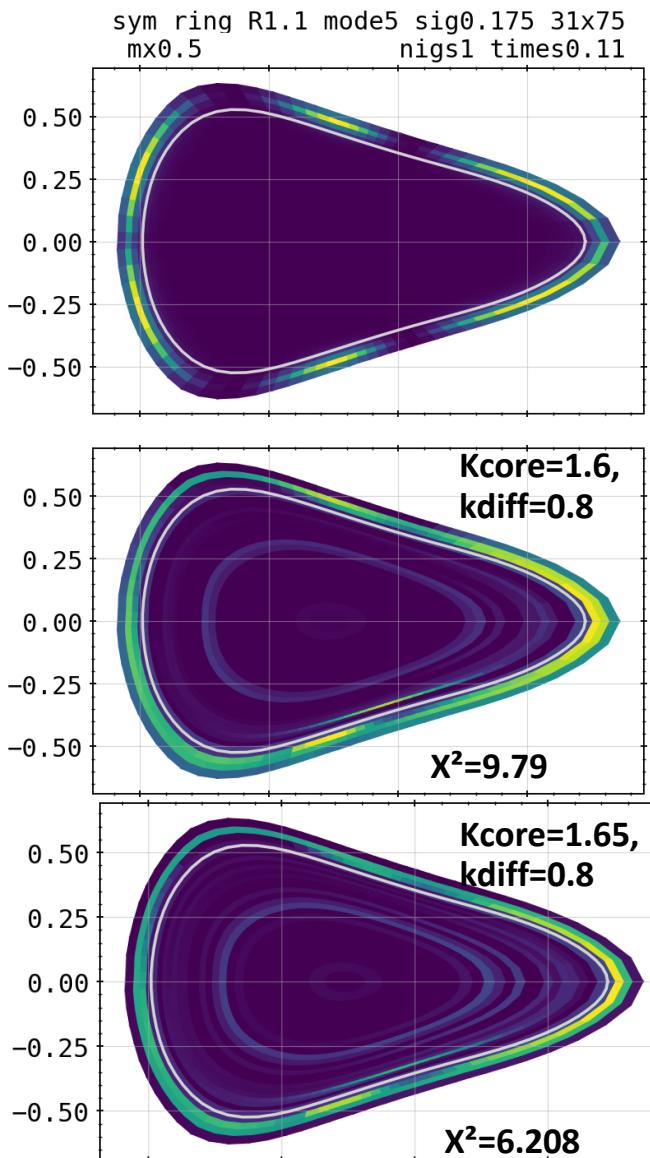
Phantoms: Ring inside LCFS Core Scan



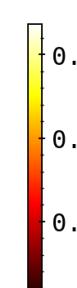
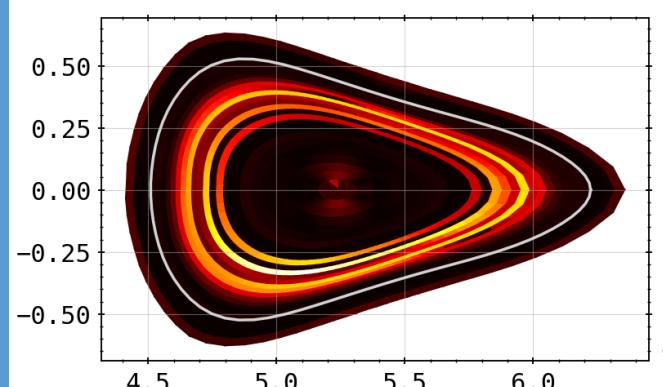
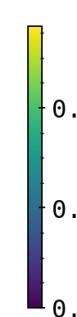
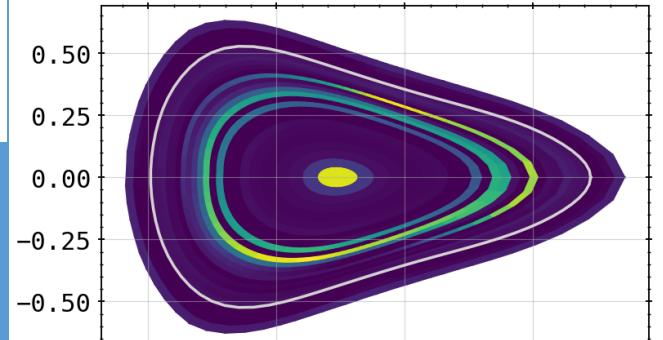
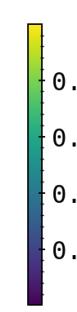
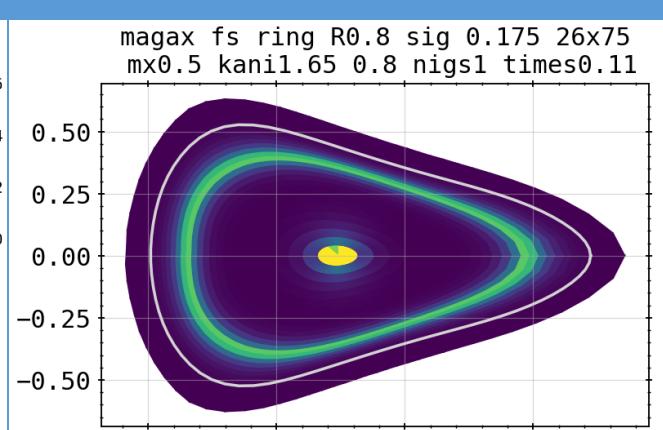
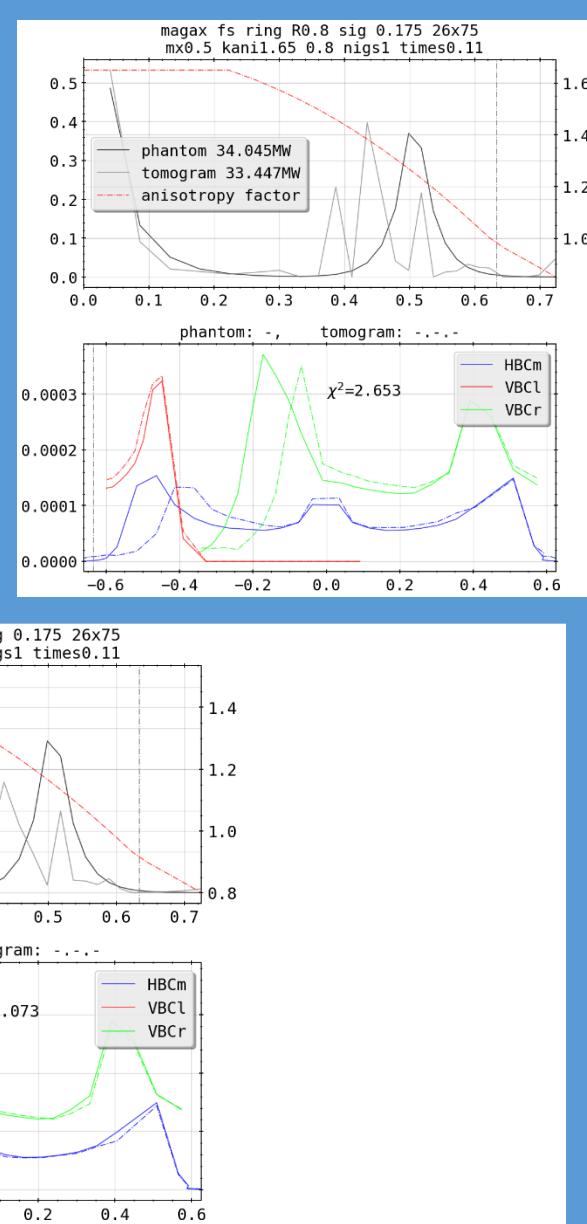
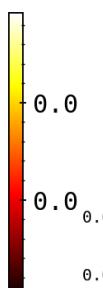
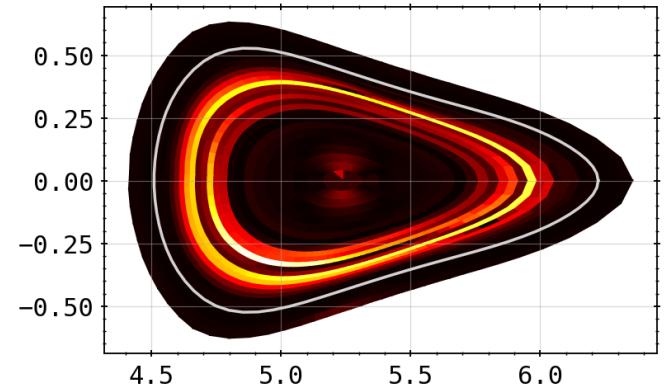
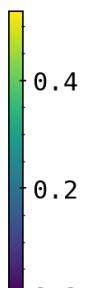
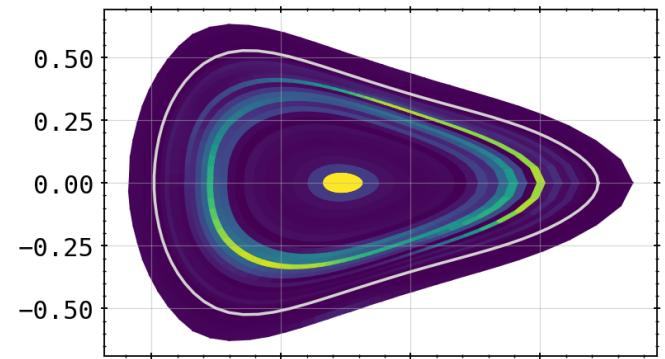
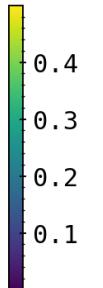
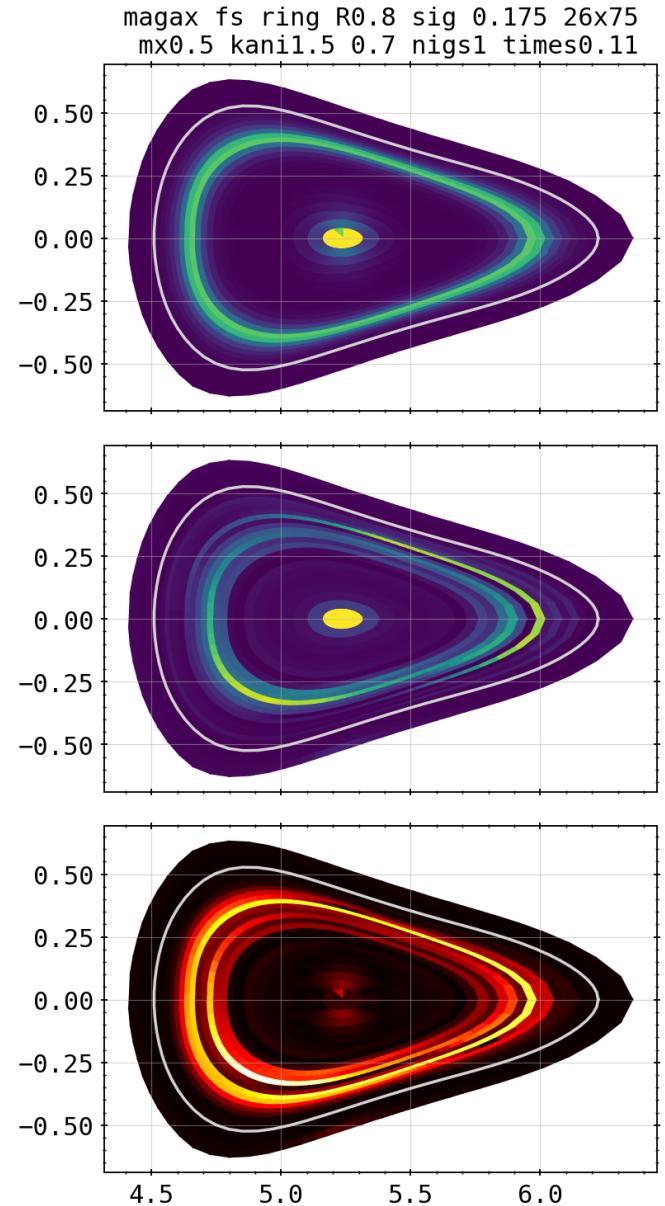
Phantoms: Ring outside LCFS Scan



Phantoms: Island Mimic outside LCFS Scan

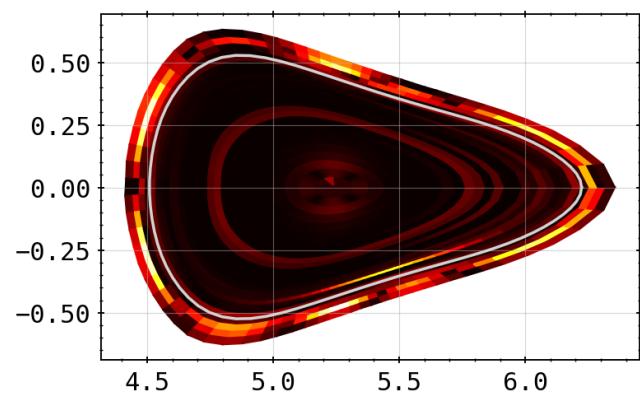
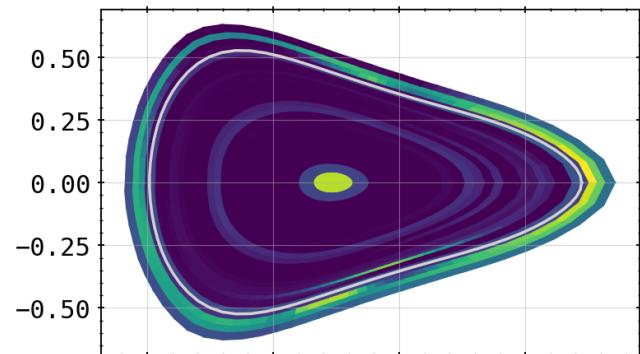
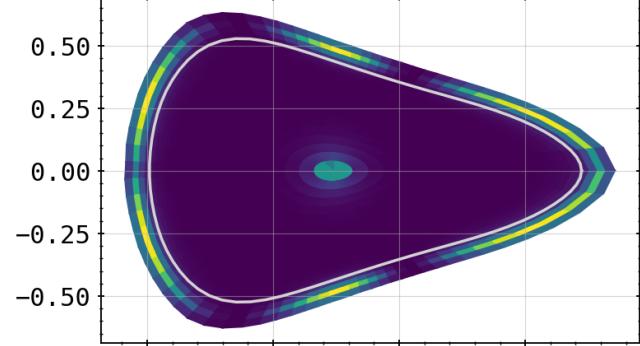


Phantoms: Combinations

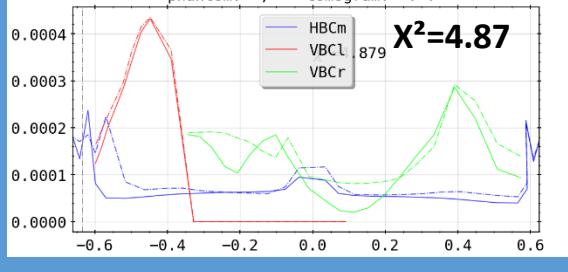
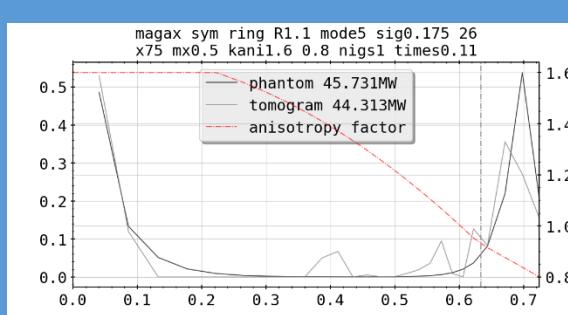


Phantoms: Combinations

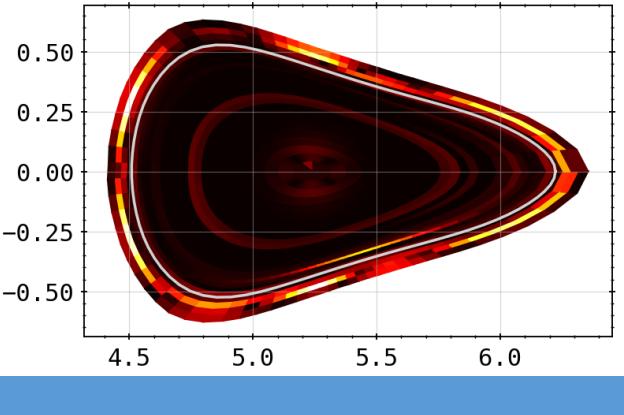
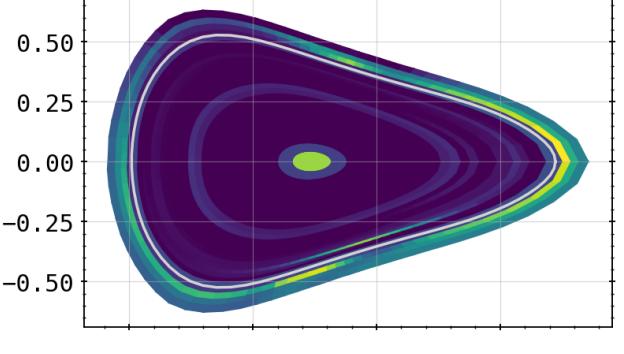
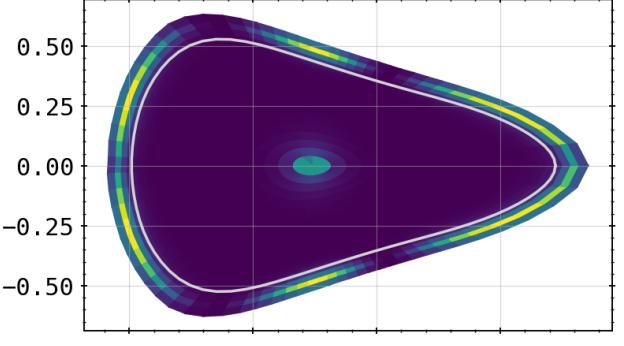
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x75 mx0.5 kani1.5 0.55 nigs1 times0.11



brightness [power/volumetric] brightness [power/volume]



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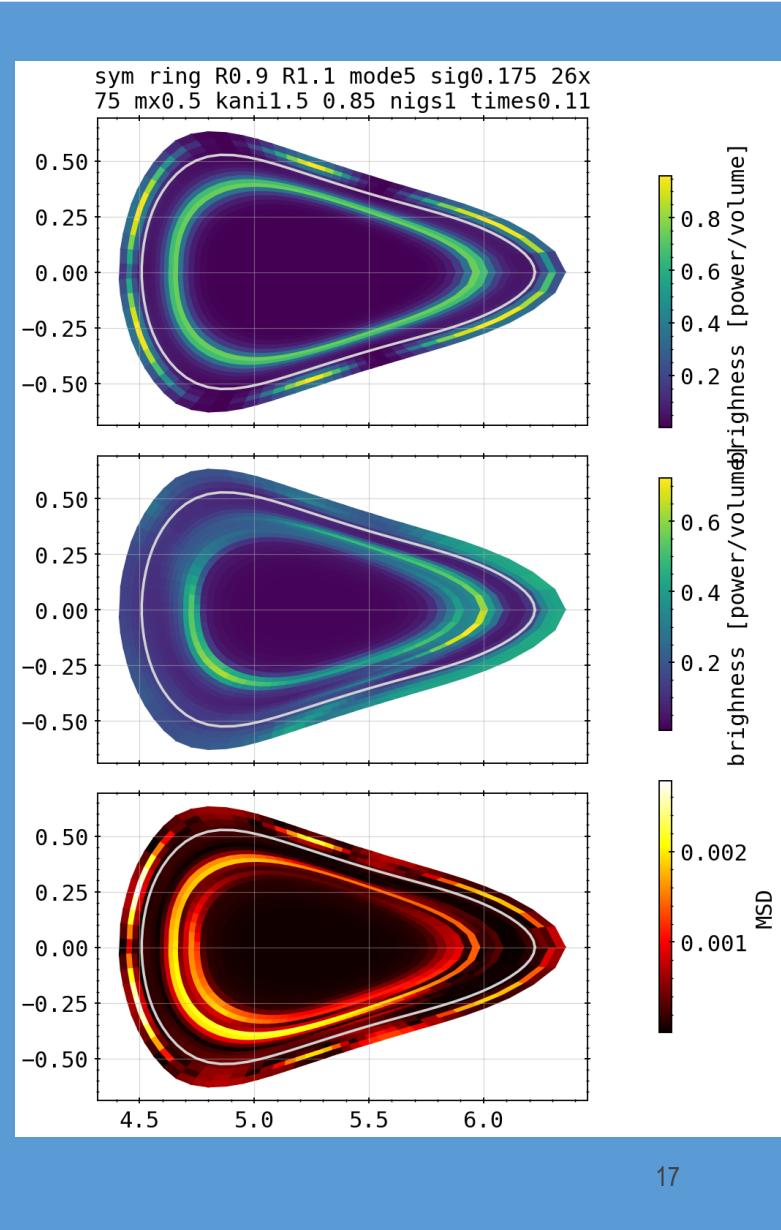
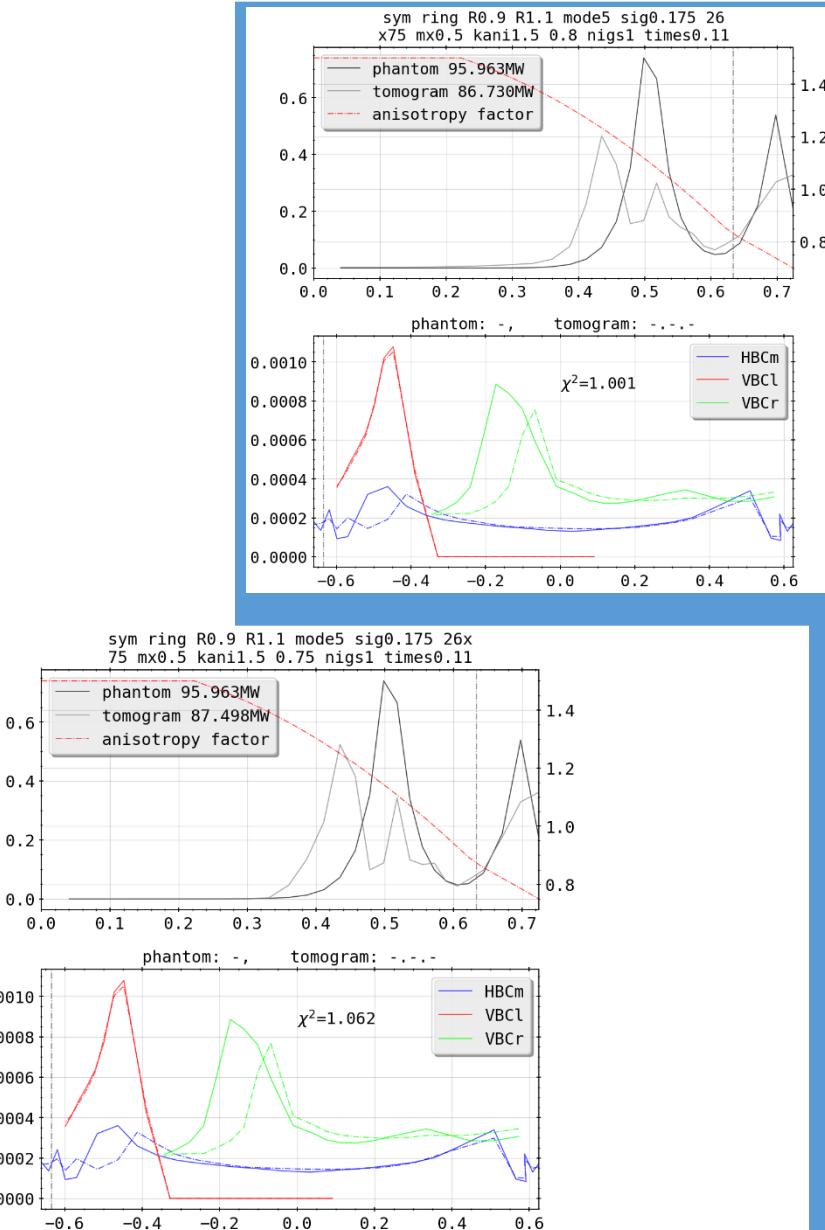
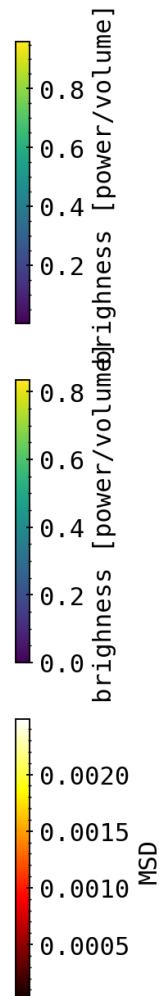
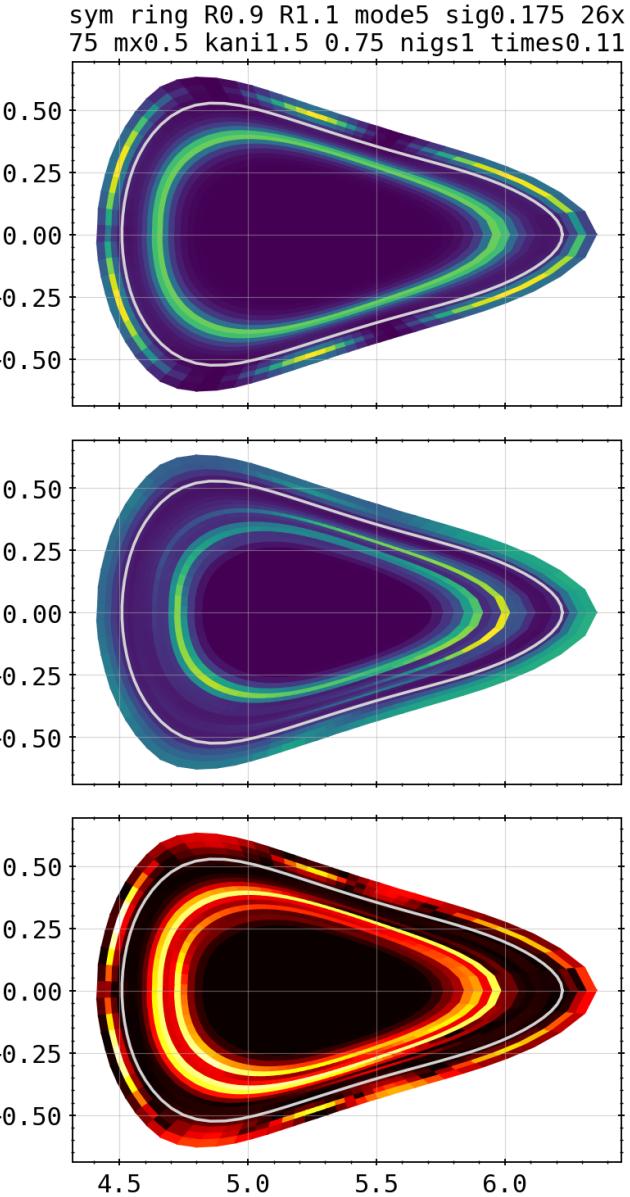


brightness [power/volumetric] brightness [power/volume]

0.004
0.003
0.002
0.001
0.000

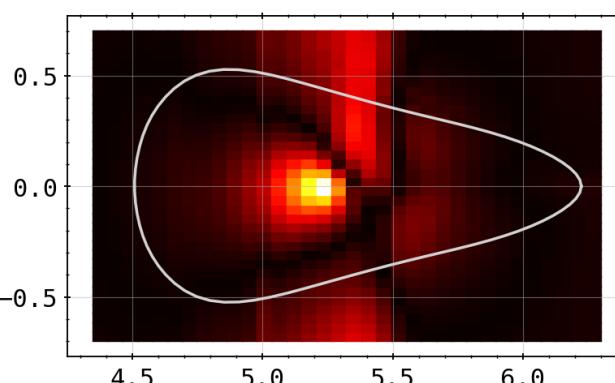
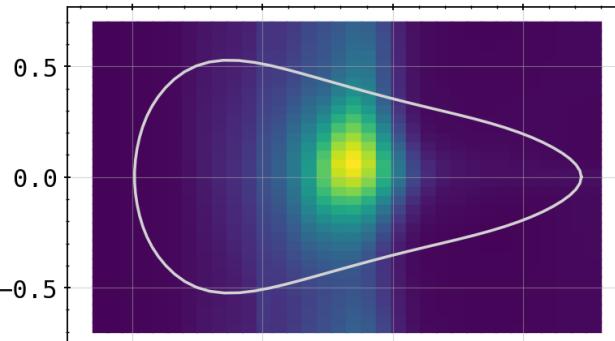
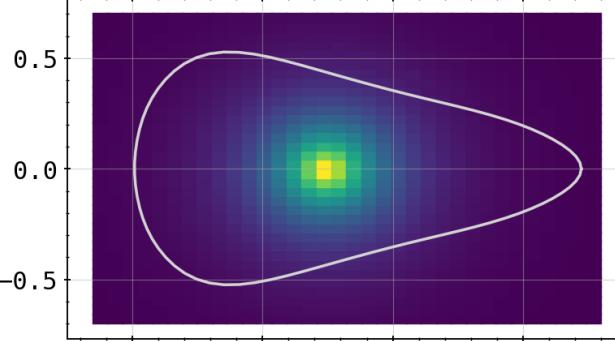
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Phantoms: Combinations

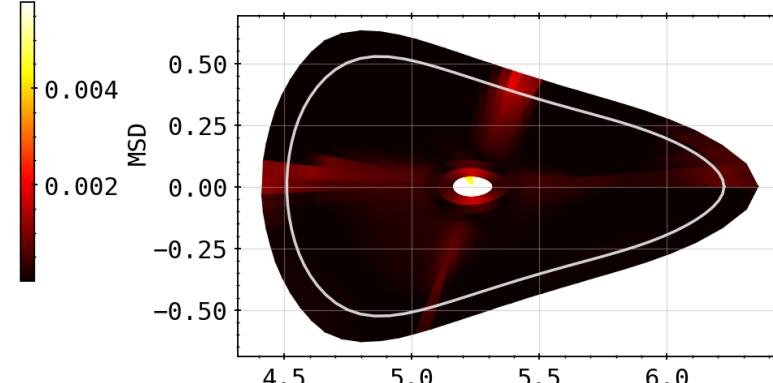
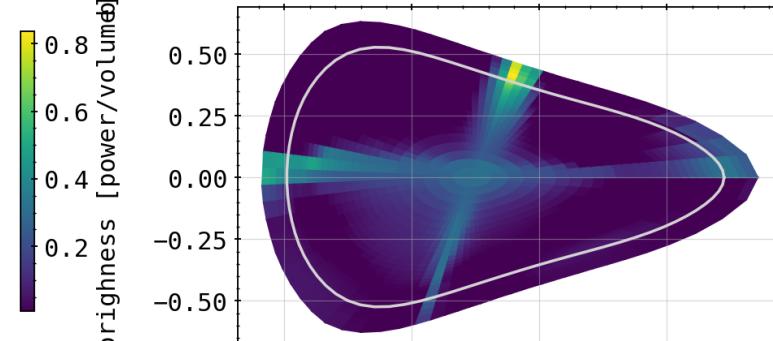
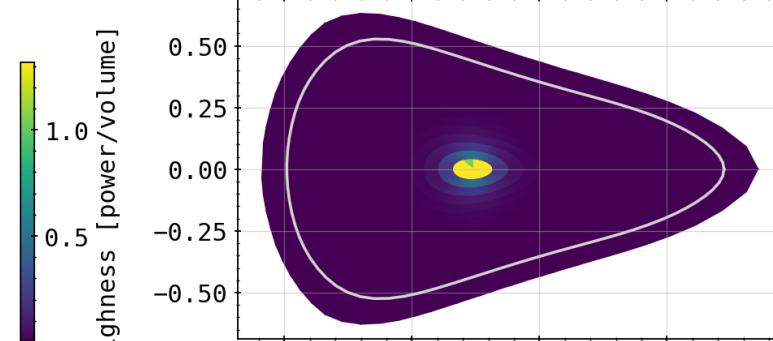


Revisited: Cartesian Test, No Anisotropic Weighting

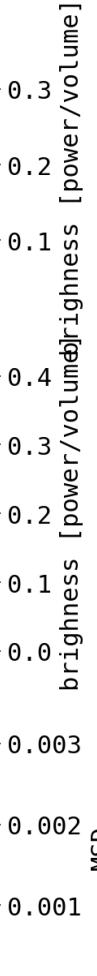
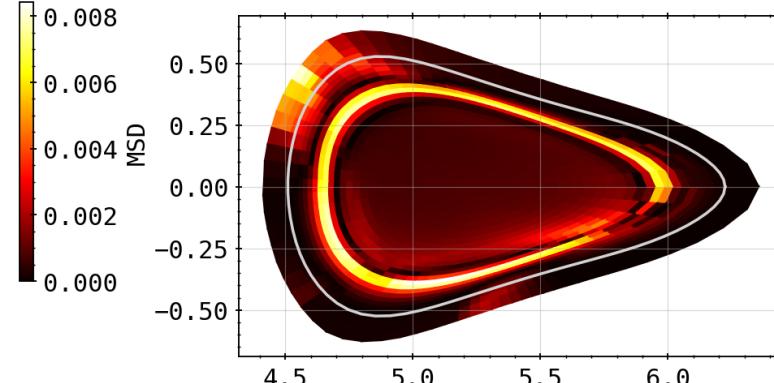
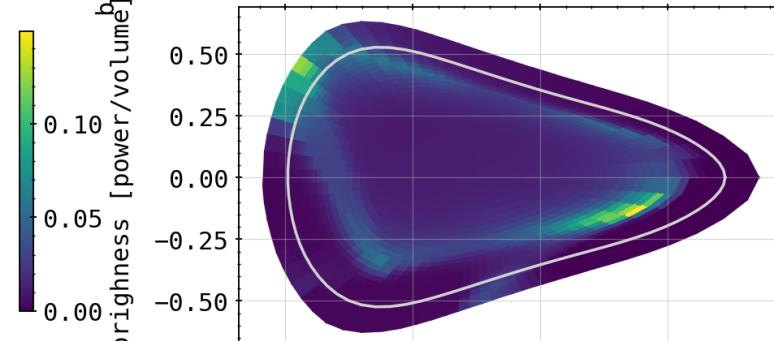
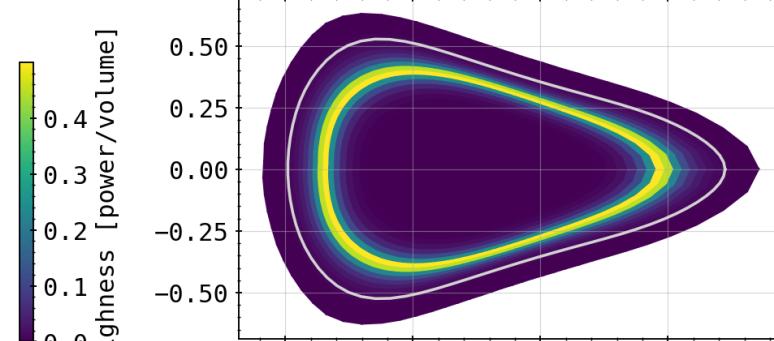
pos x5.25 sig0.3 34x34 cartesian mx1.5
kani1.5 0.8 nigs1 times0.11 cartesian



magax dist R0.0 sig0.175 26x75
mx0.5 no ani nigs1 times0.11

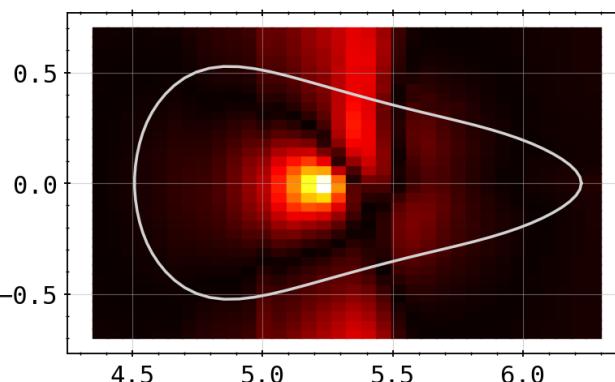
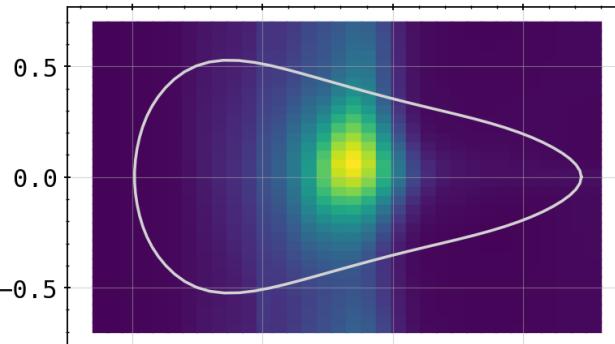
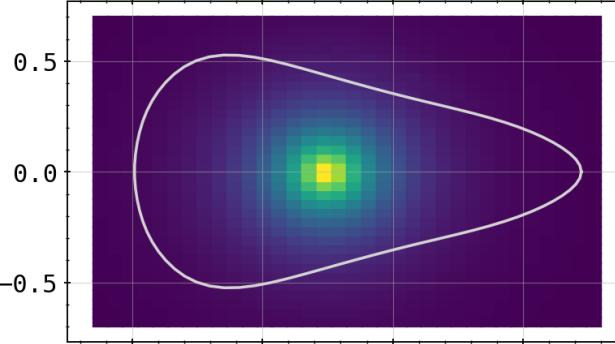


fs reff ring R0.8 sig0.175 26x7
5 mx0.5 no ani nigs1 times0.11

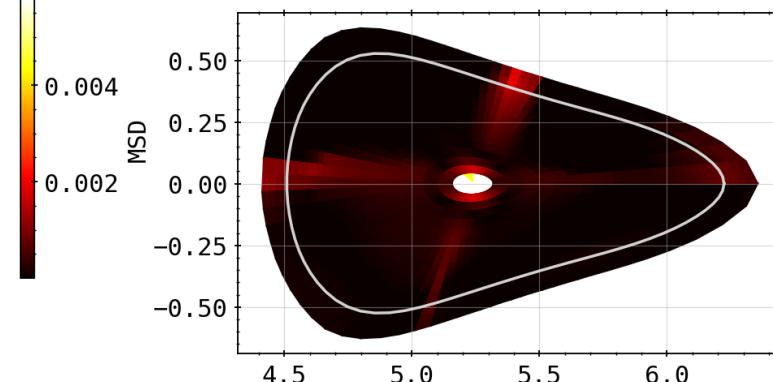
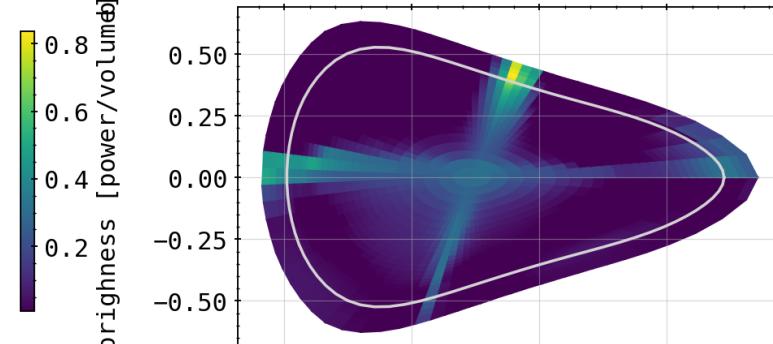
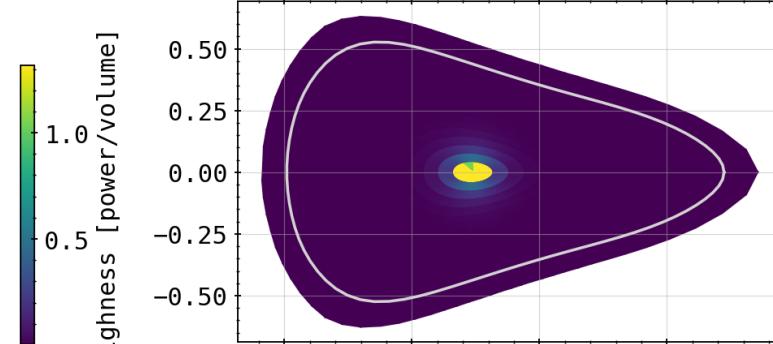


Revisited: Cartesian Test, No Anisotropic Weighting

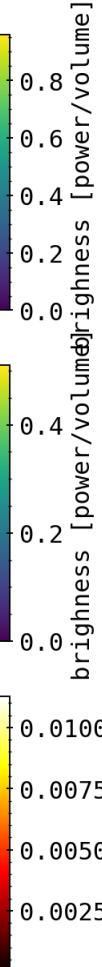
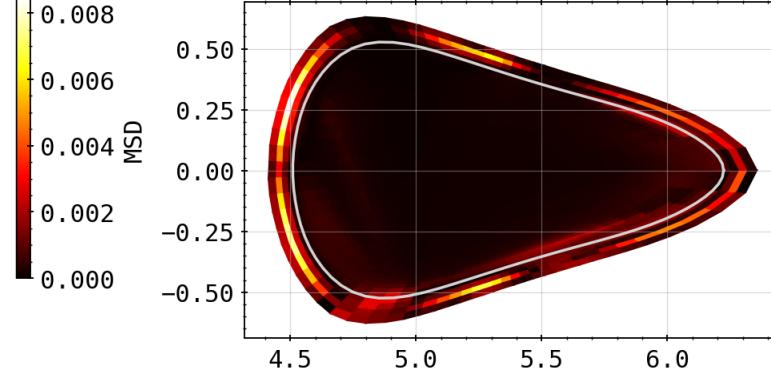
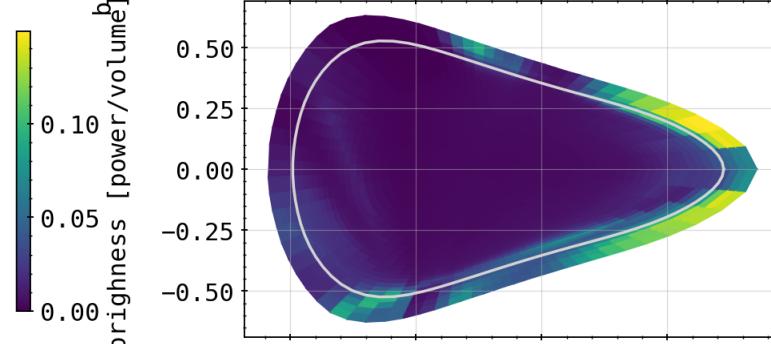
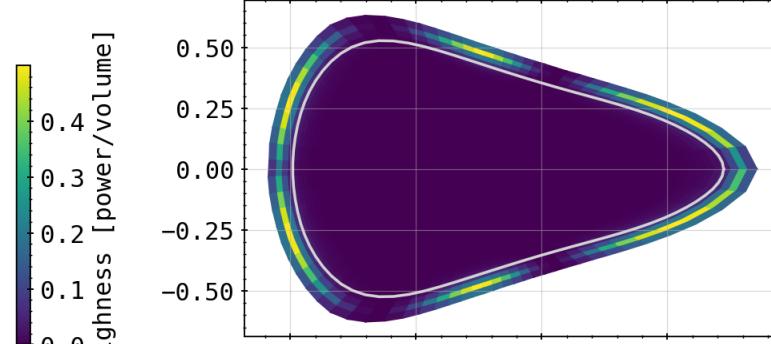
pos x5.25 sig0.3 34x34 cartesian mx1.5
kani1.5 0.8 nigs1 times0.11 cartesian



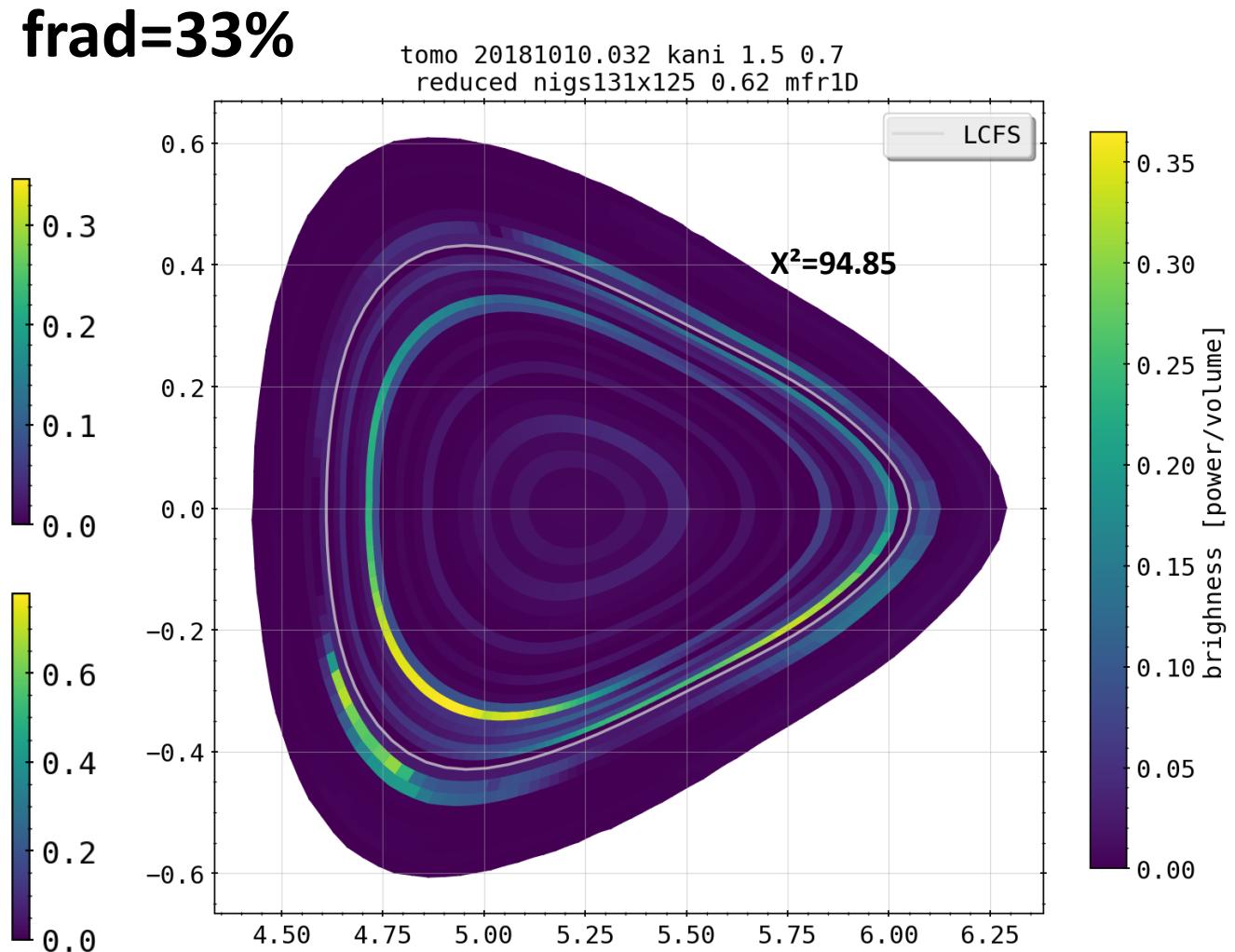
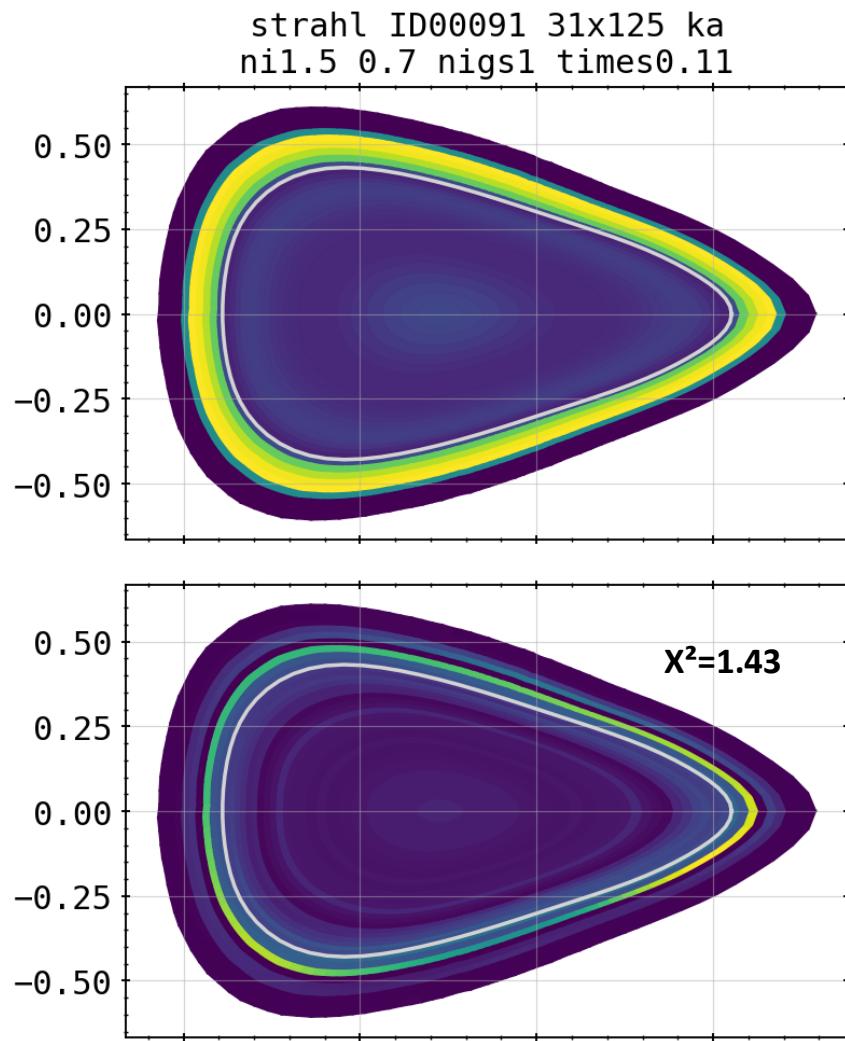
magax dist R0.0 sig0.175 26x75
mx0.5 no ani nigs1 times0.11



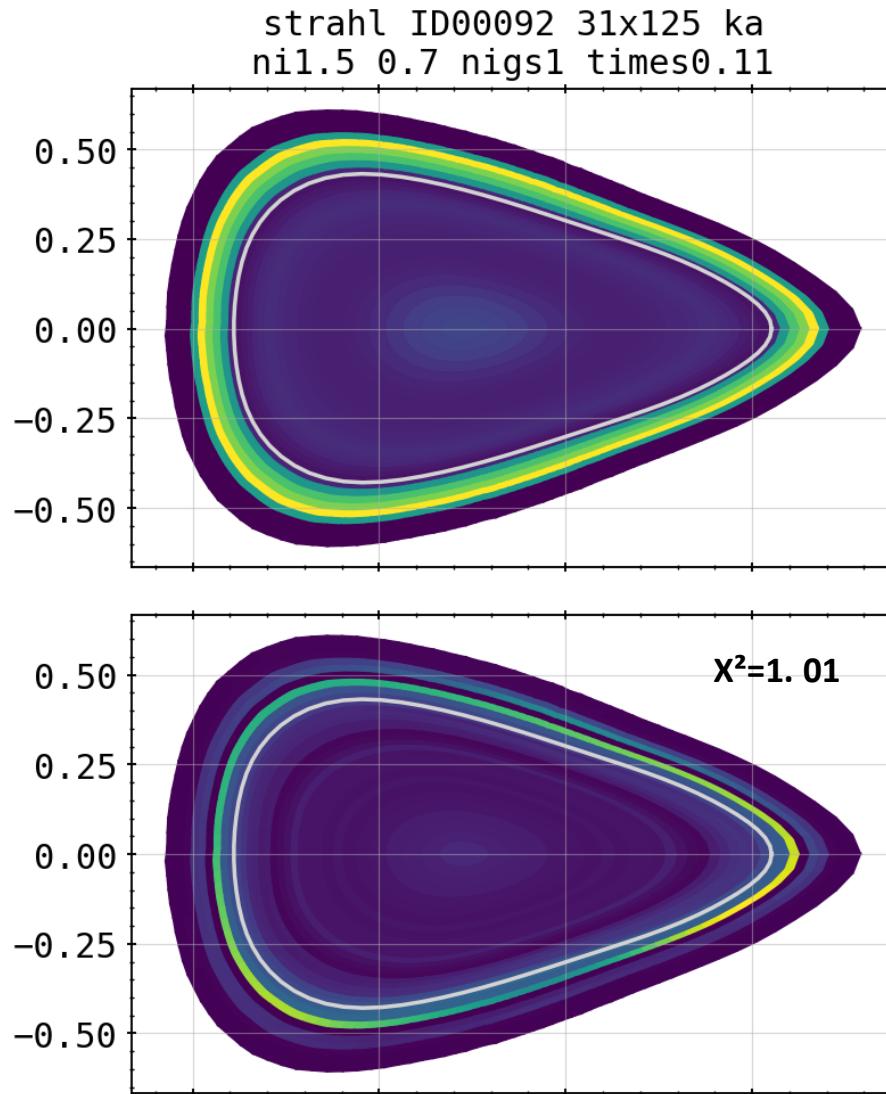
sym ring R1.1 mode5 sig0.175 31x
75 mx0.5 no ani nigs1 times0.11



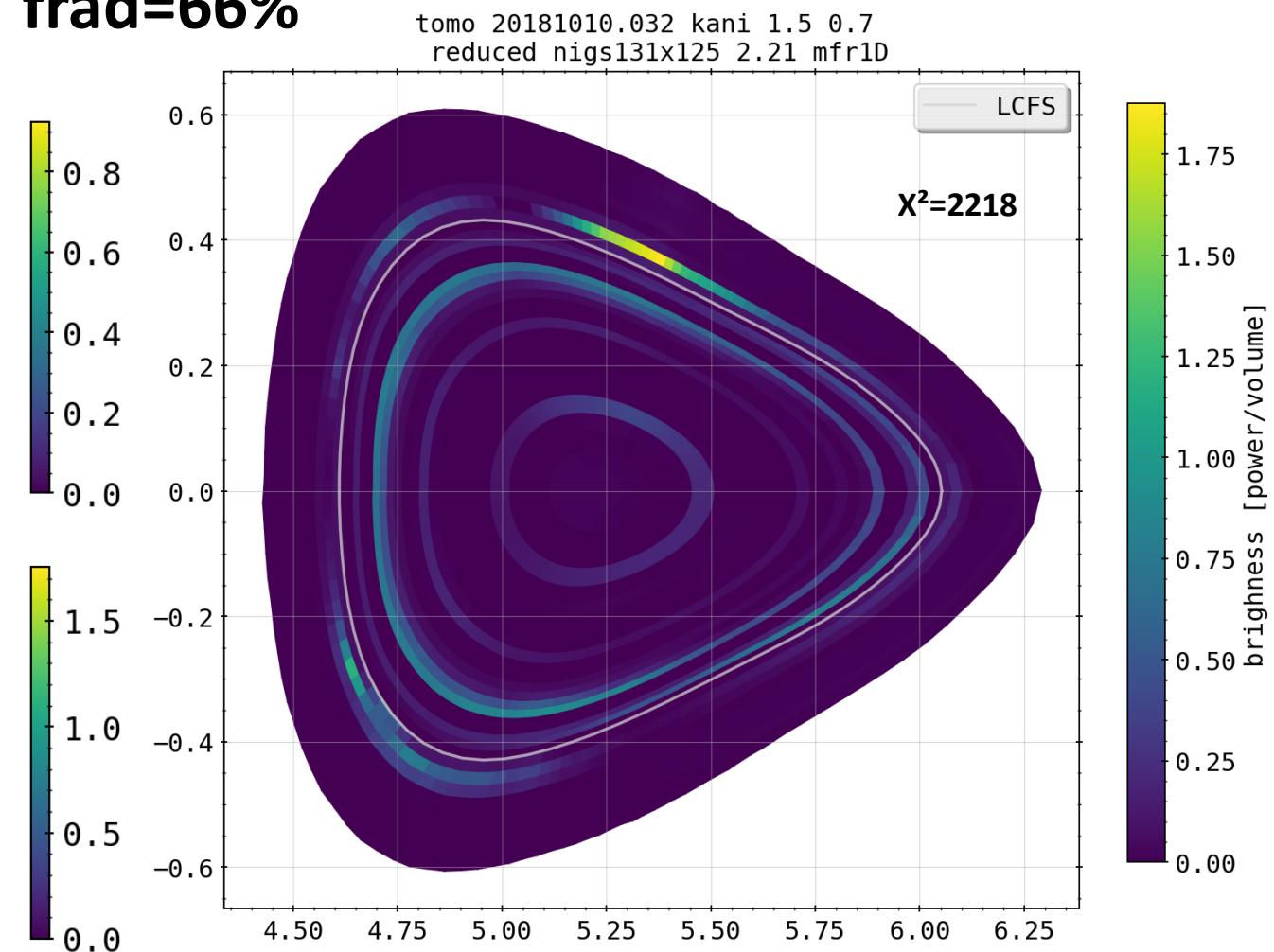
STRAHL Profiles and 20181010.032 Feedback Discharge



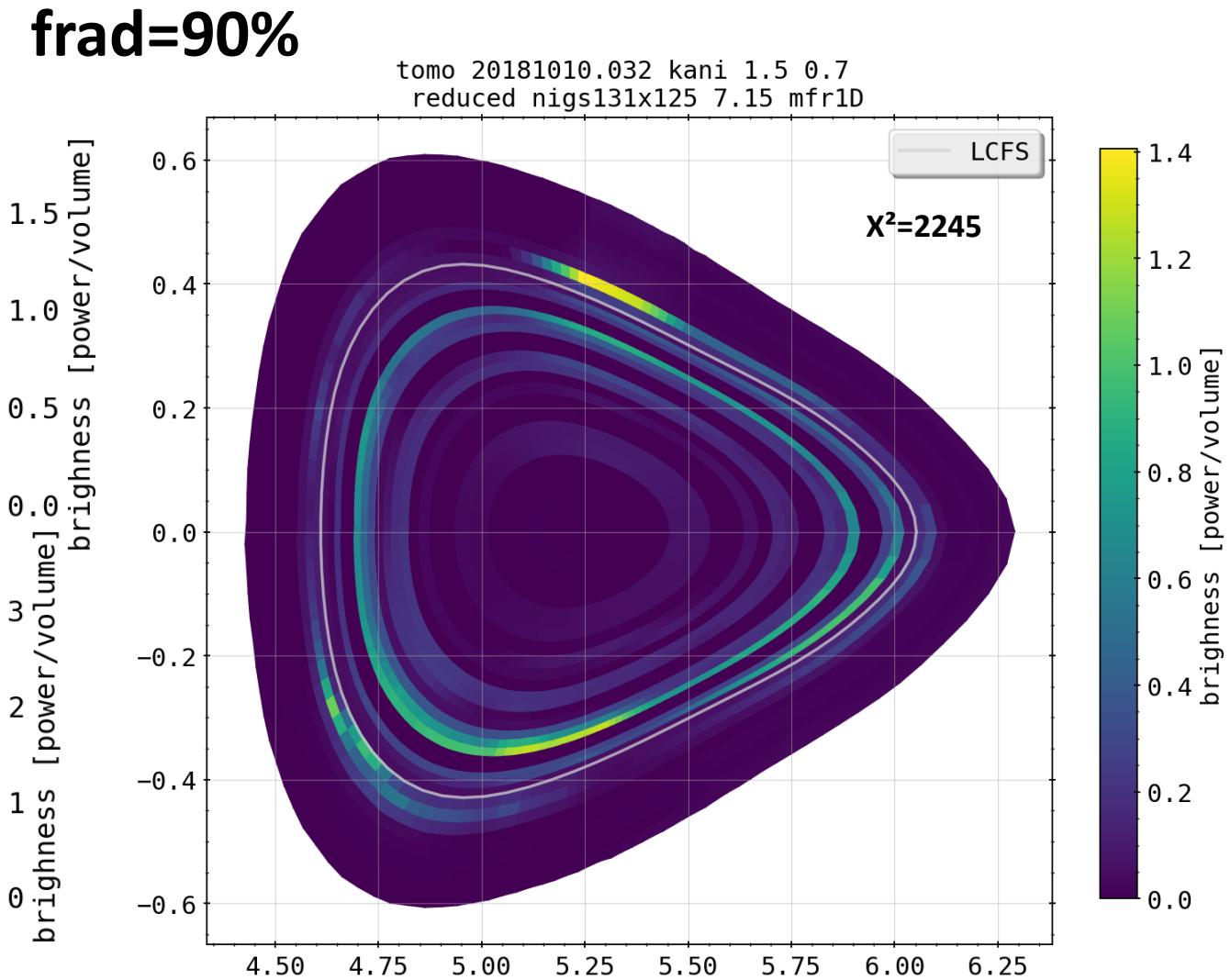
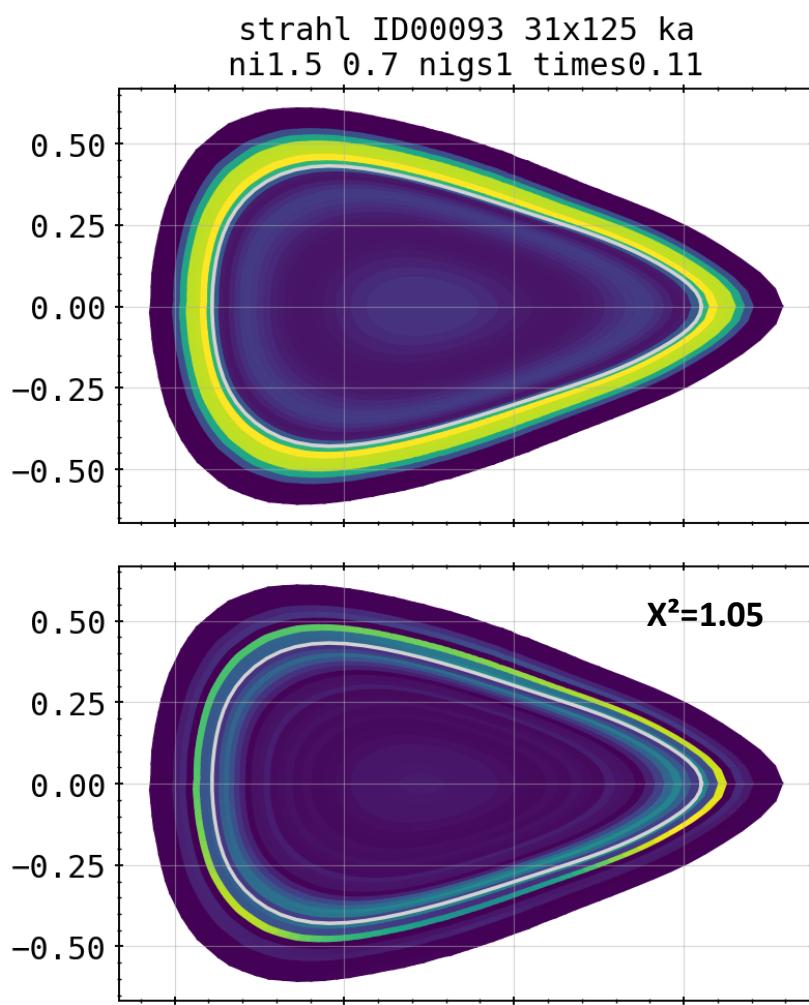
STRAHL Profiles and 20181010.032 Feedback Discharge



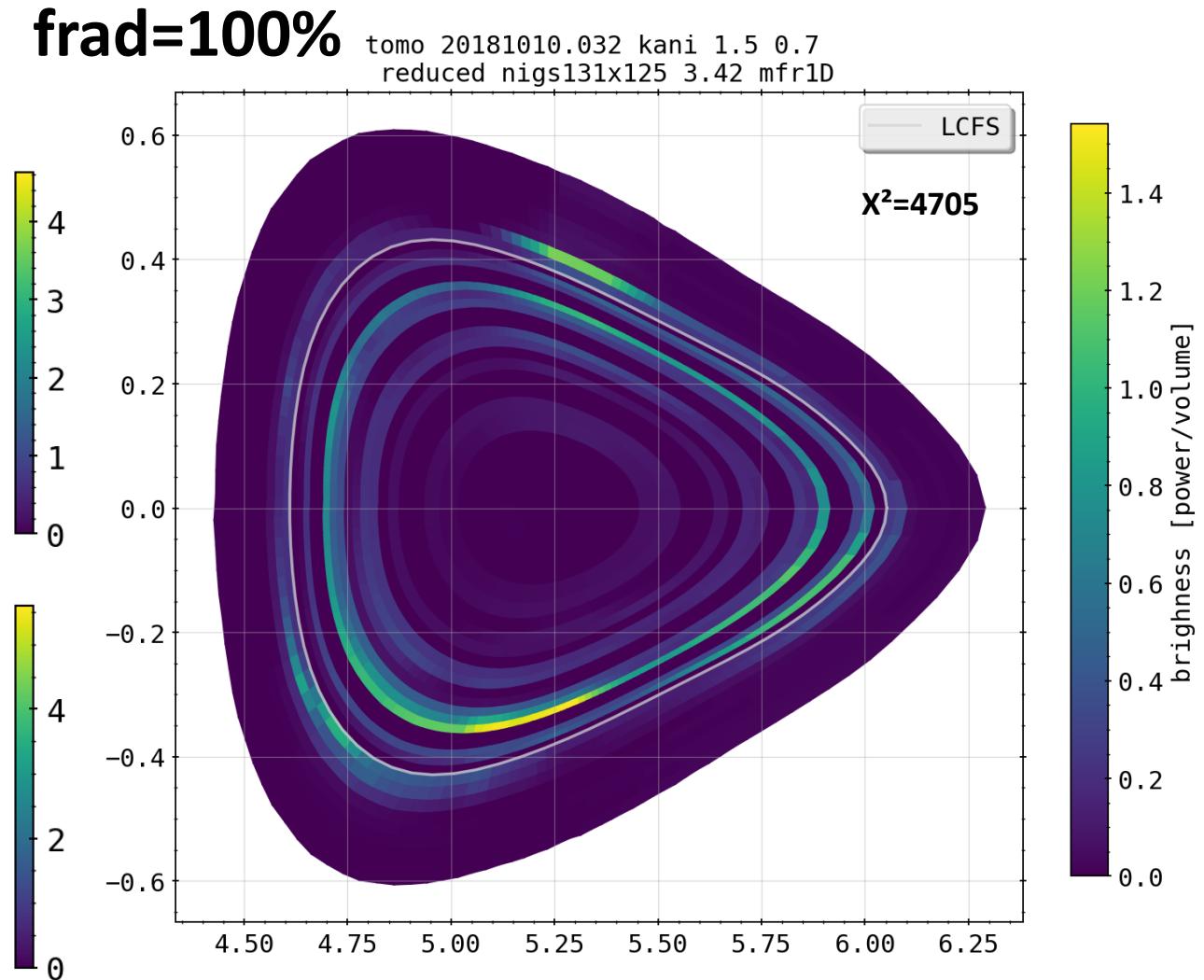
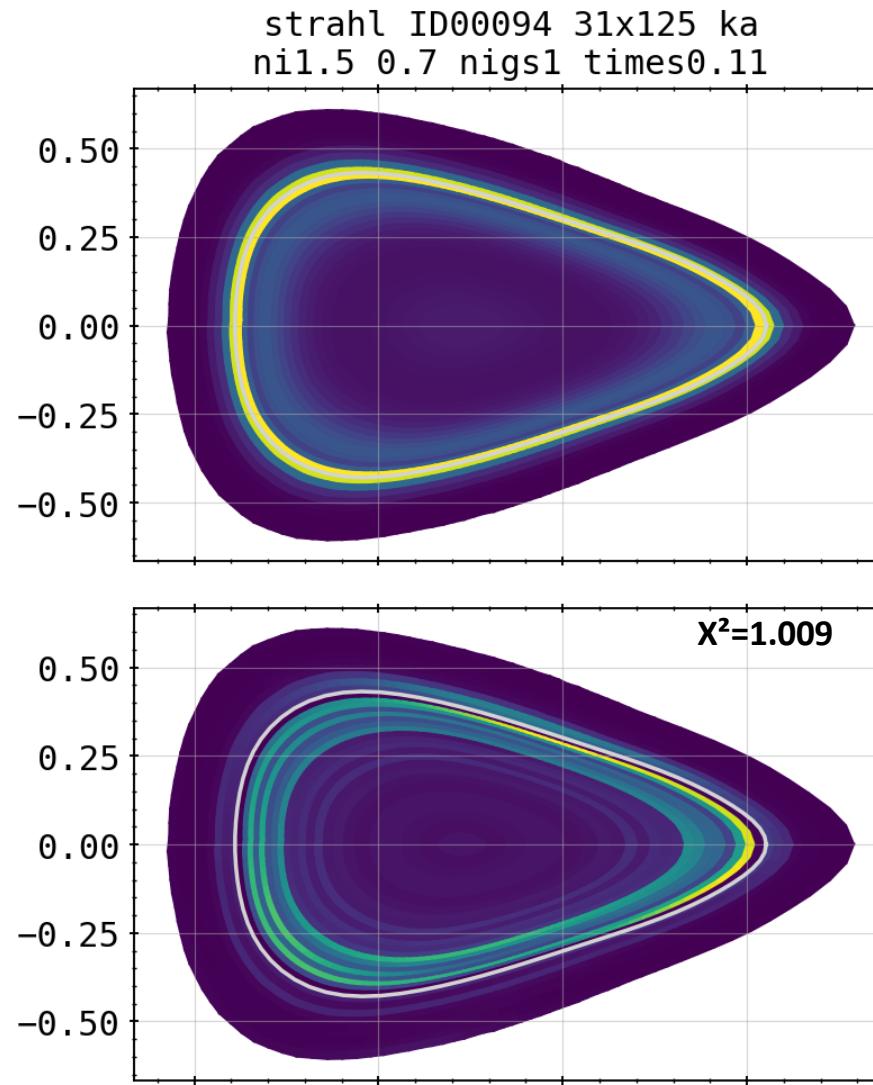
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STRAHL Profiles and 20181010.032 Feedback Discharge



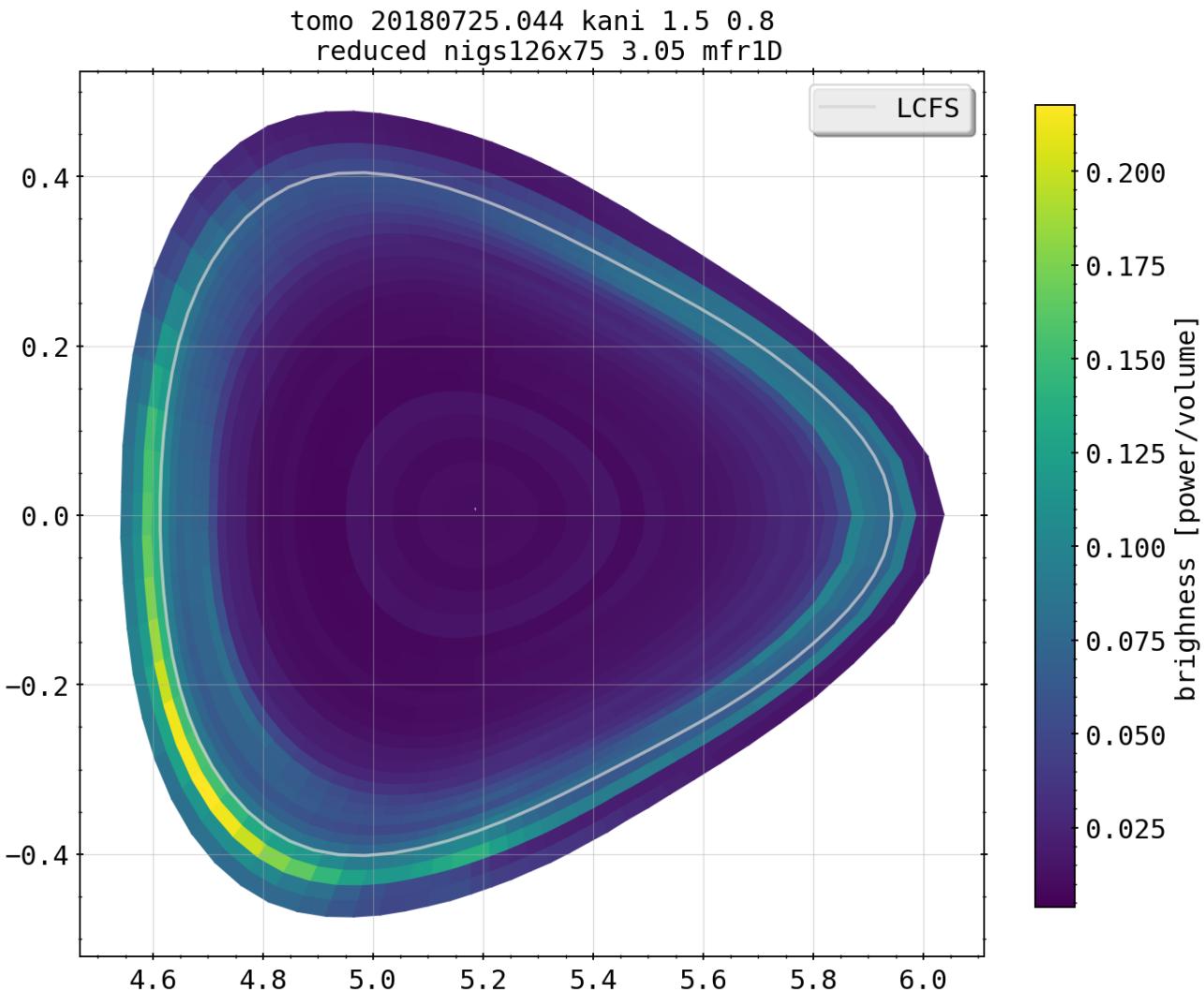
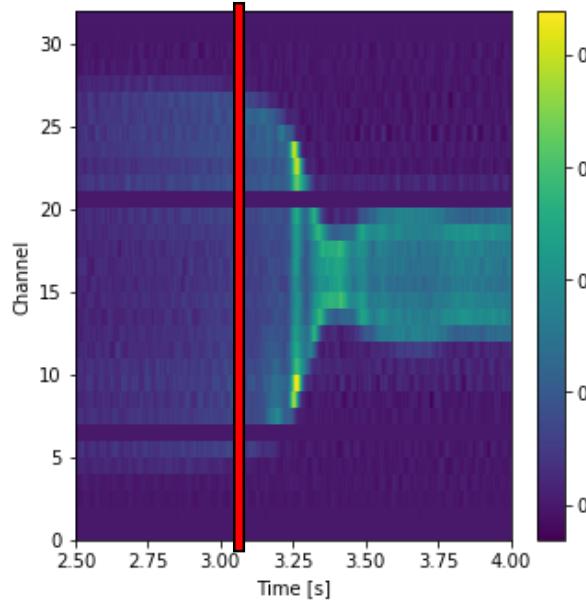
STRAHL Profiles and 20181010.032 Feedback Discharge



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

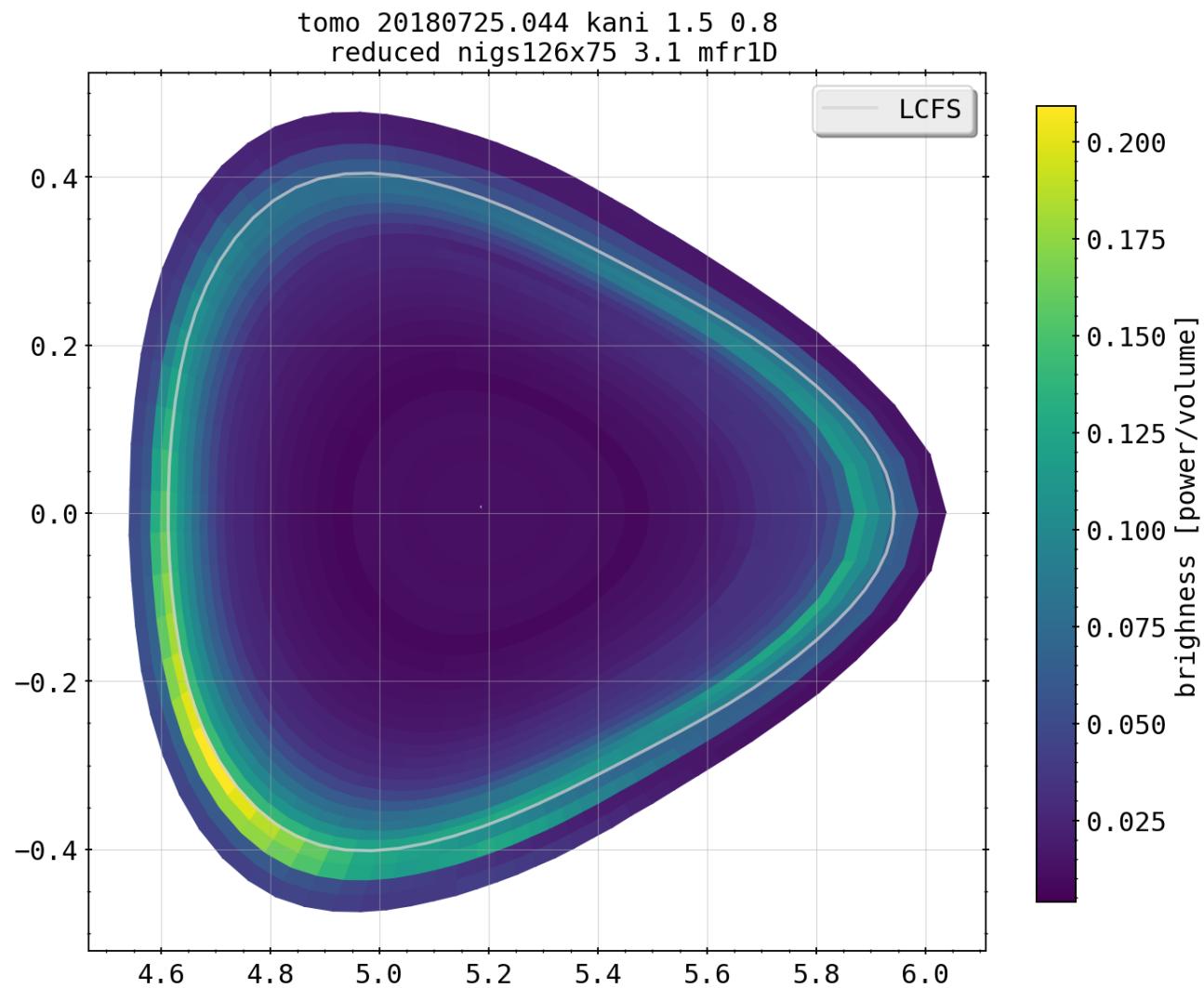
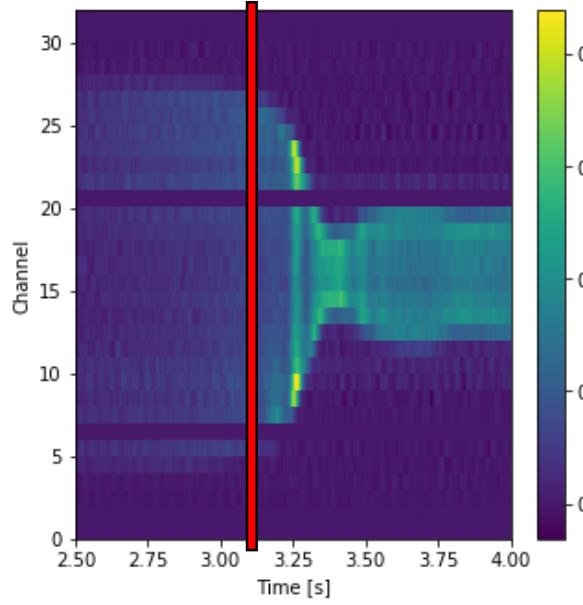
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

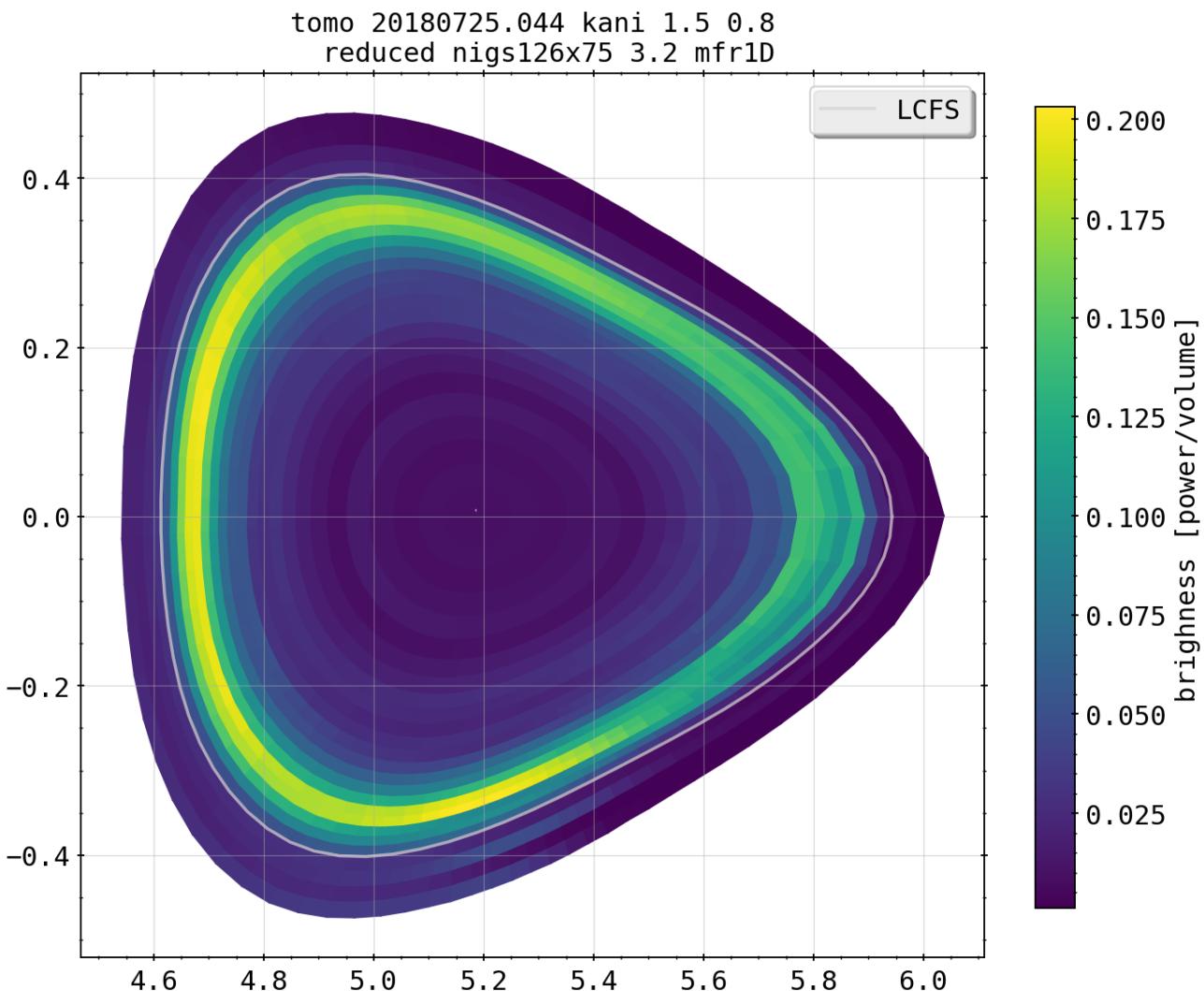
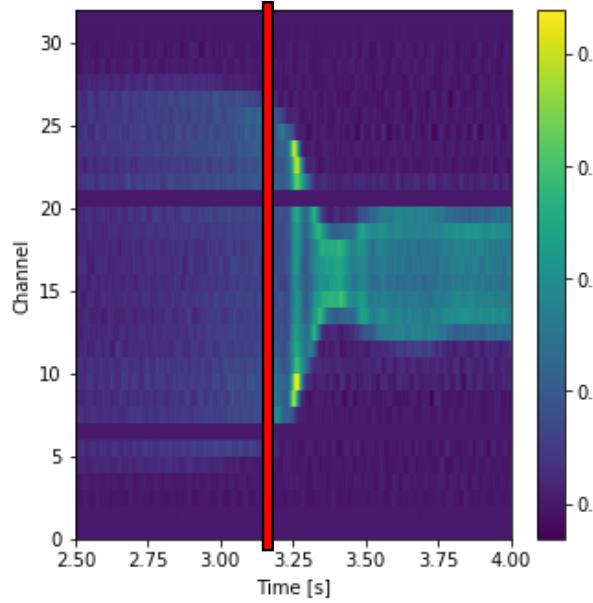
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

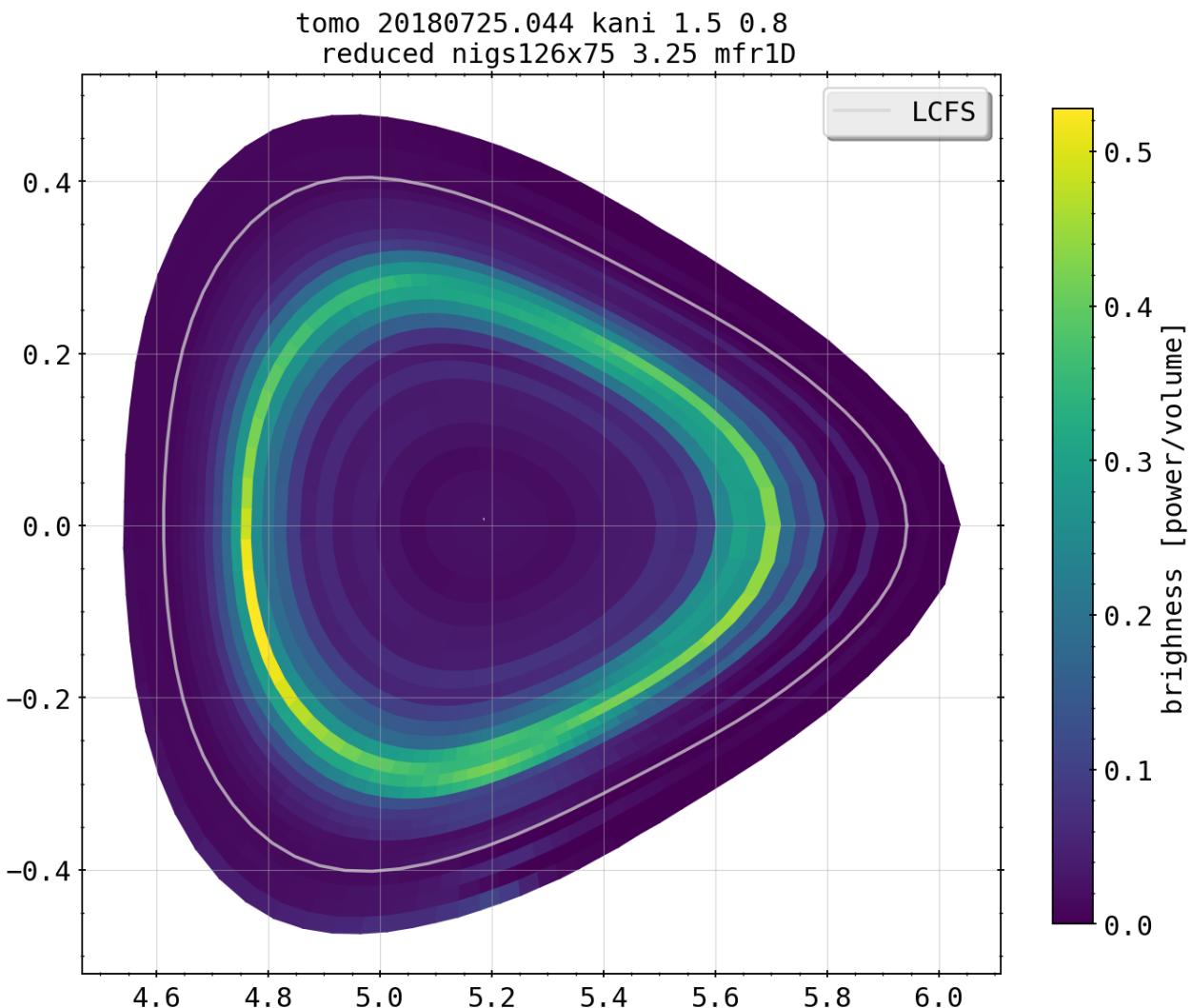
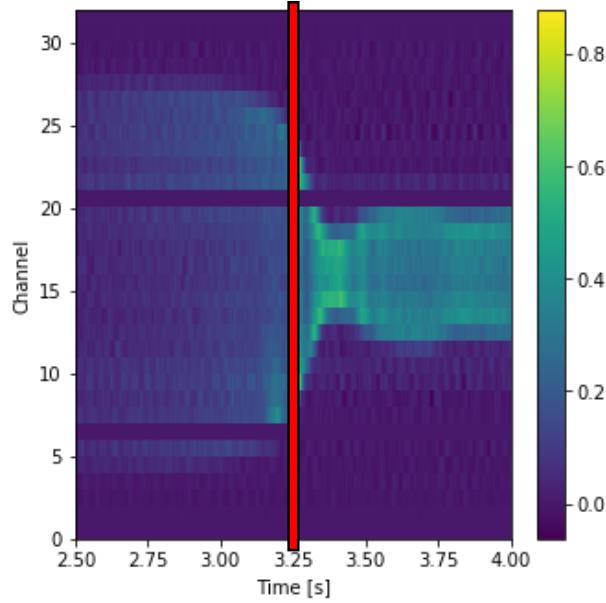
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

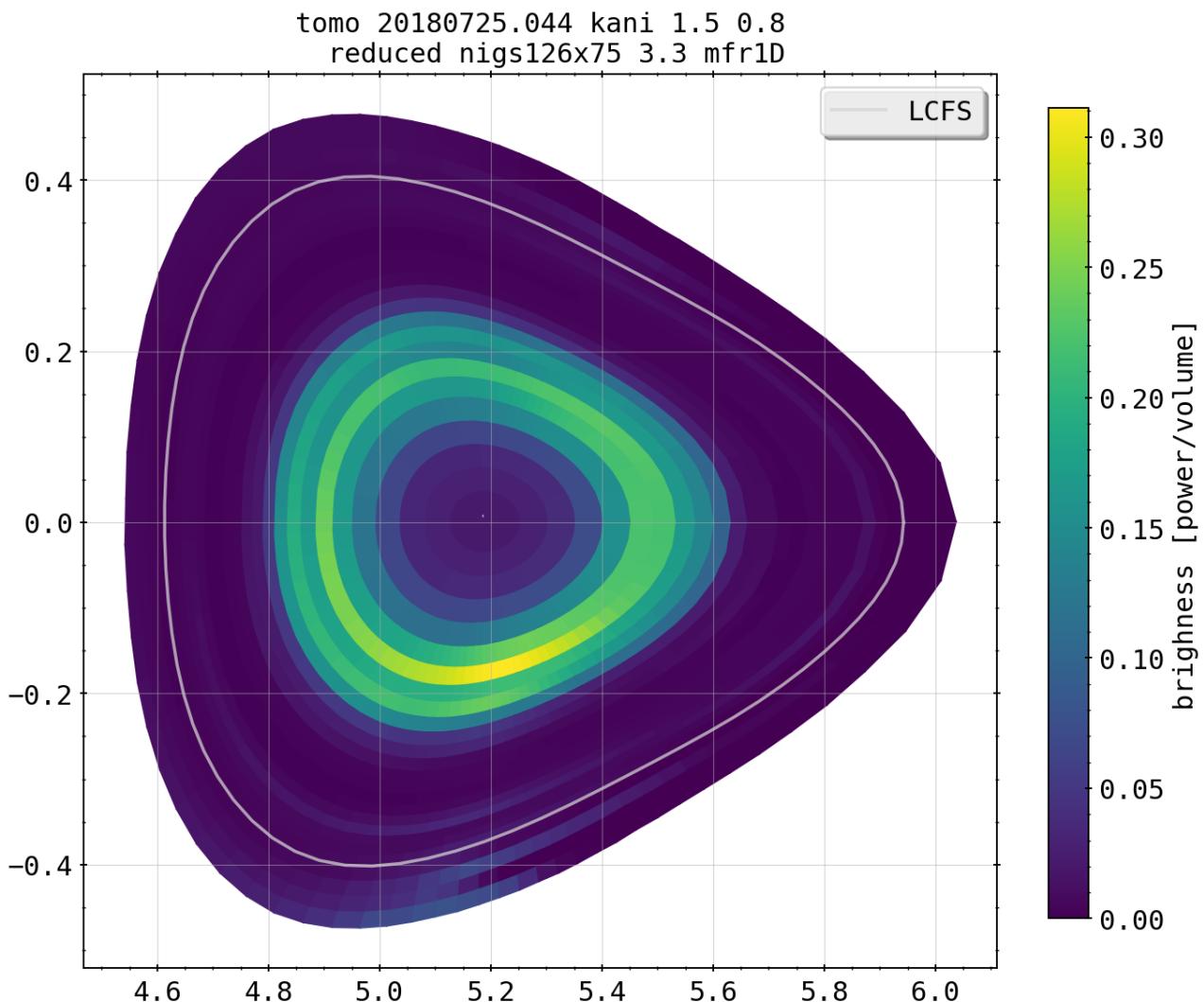
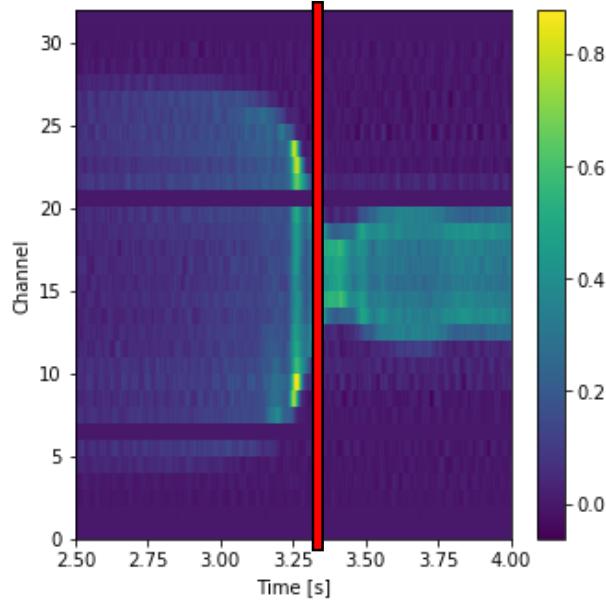
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

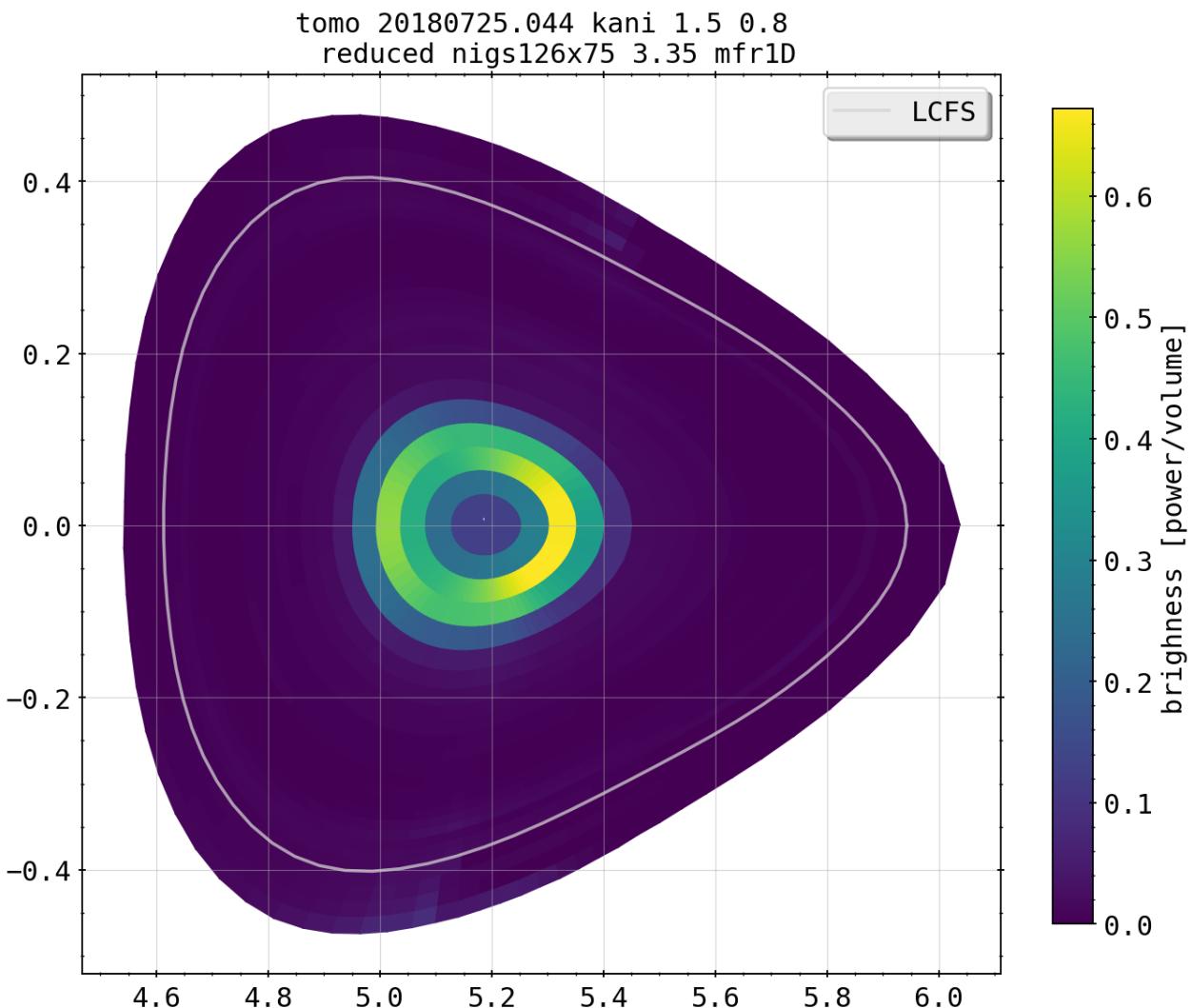
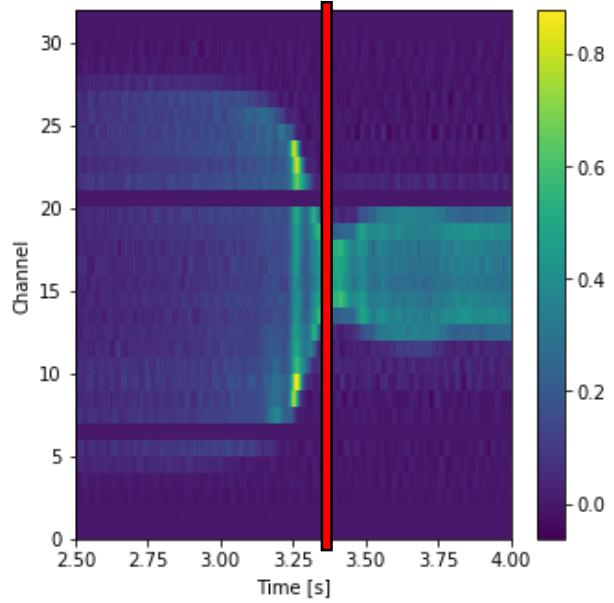
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

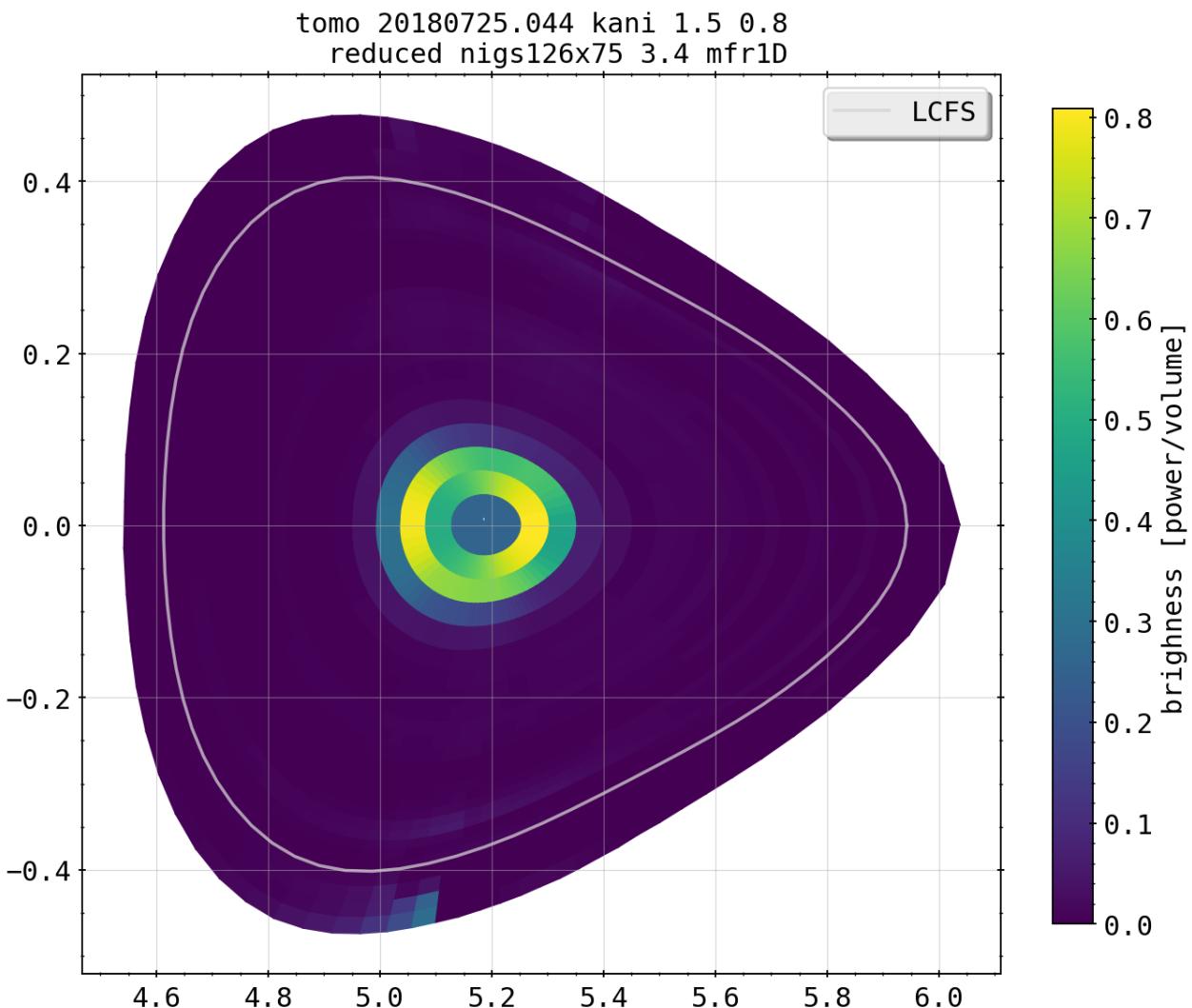
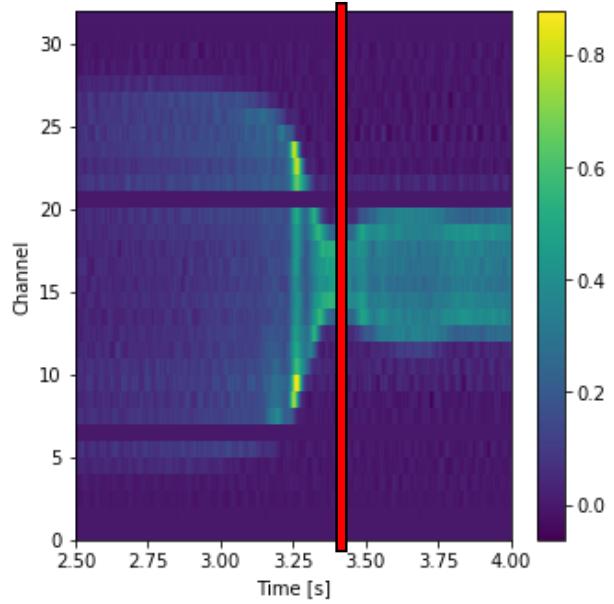
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

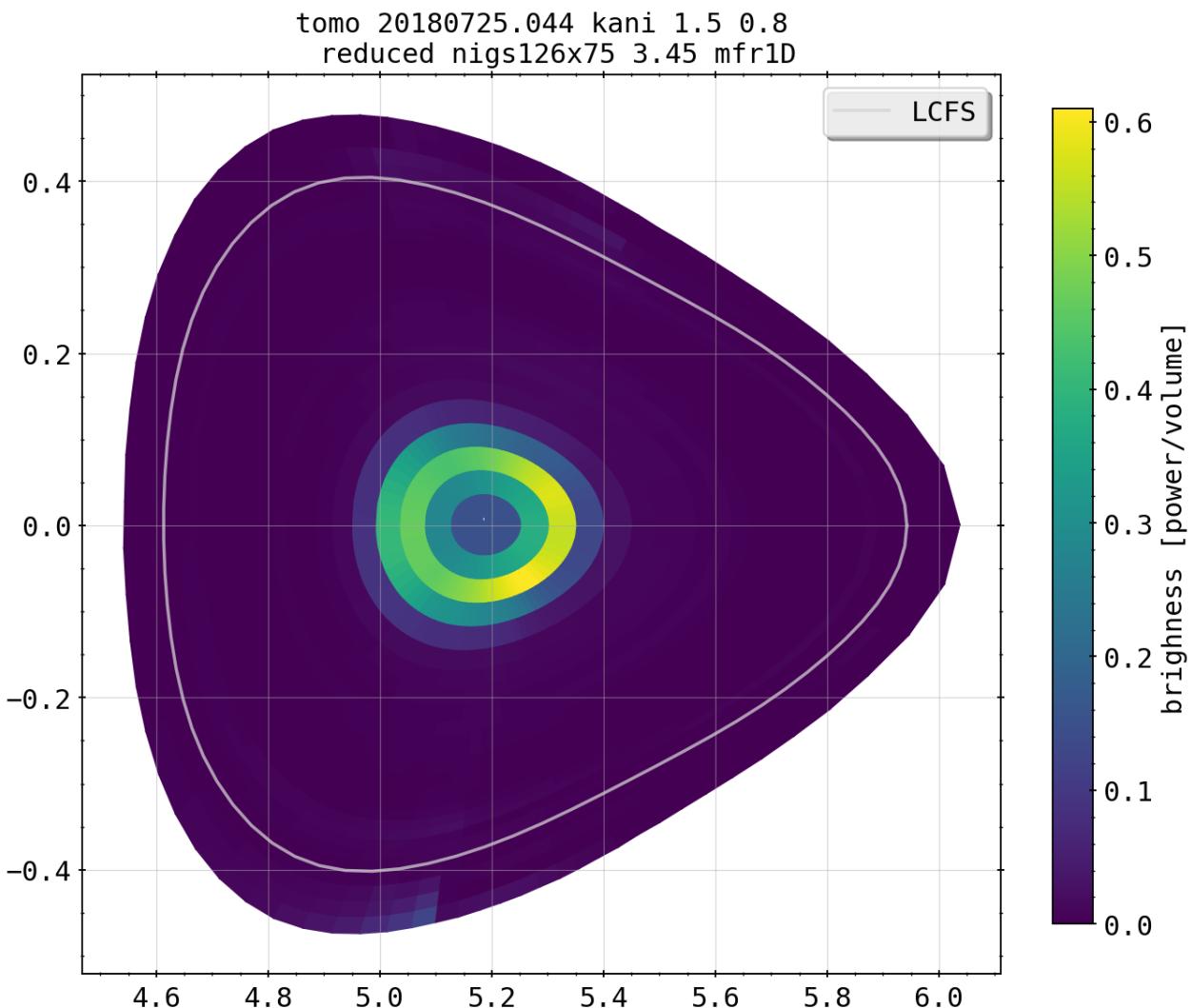
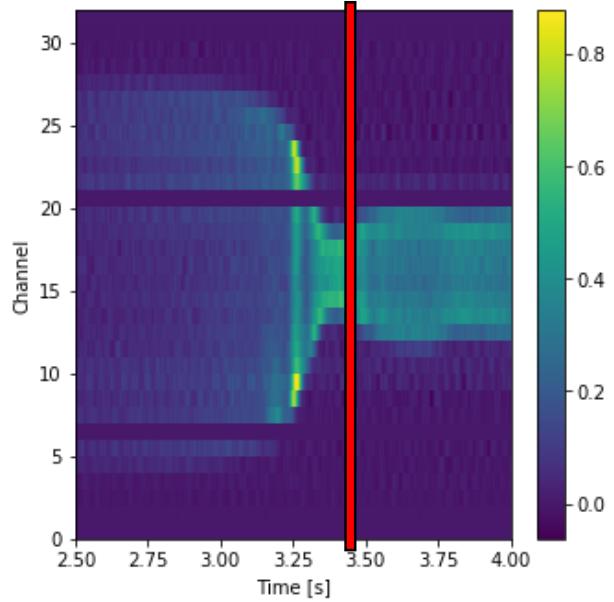
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

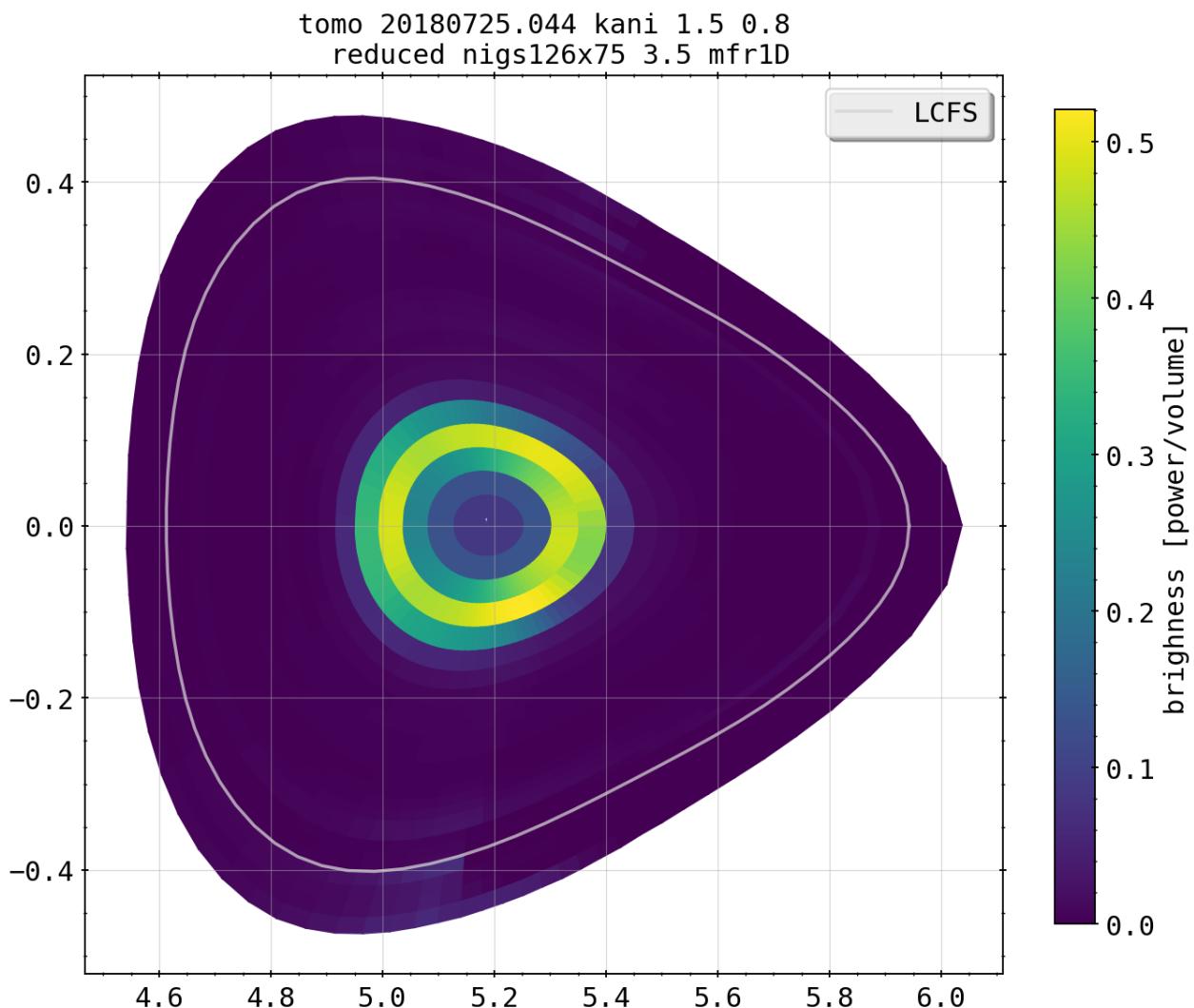
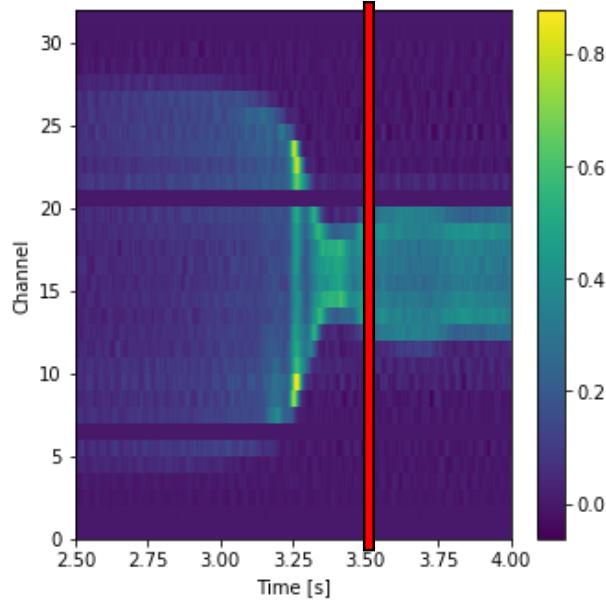
chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

chordal profile HBCm



Revisited: Test of 20180725.044

➤ KJM magnetic configuration

chordal profile HBCm

