

QACITS

Model parameters for the Hale telescope

Entrance pupil

	outer diam	inner diam
Telescope	5,093	1,829 m
PHARO	16,88	6,06 mm
	100	35,9 %

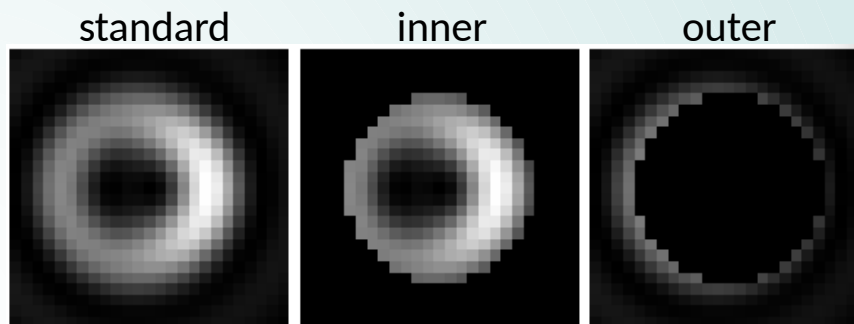
Lyot pupil dimensions

	outer diam	inner diam
Lyot 1	16,5	6,1 mm
Lyot 2	13,2	7,3 mm
Lyot 3	15	6,7 mm

$$\Delta I_x = \beta T^3 + \gamma T$$

Model parameter values

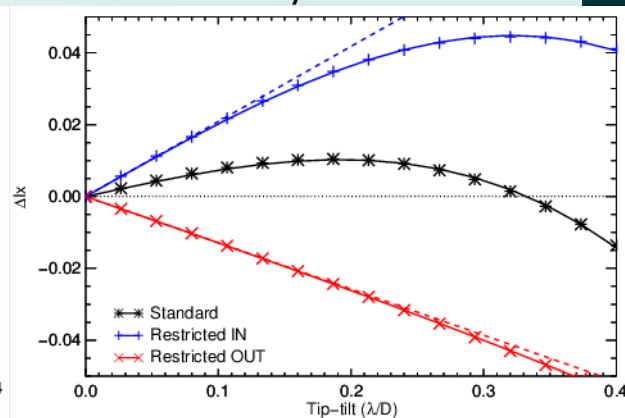
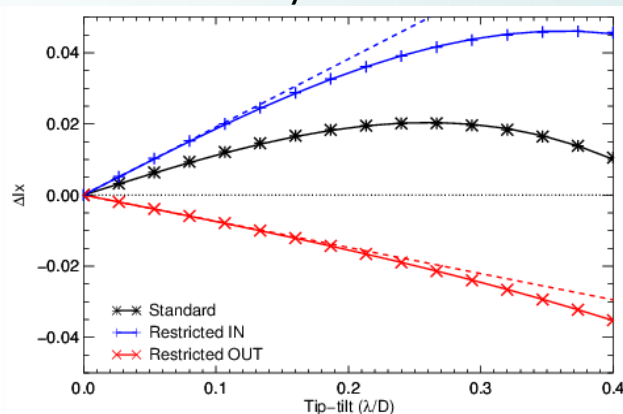
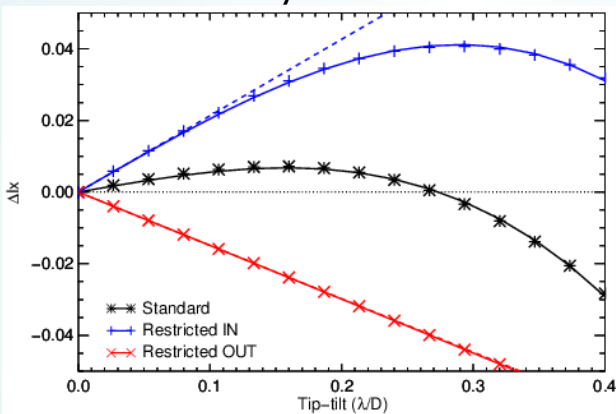
	Dimensions in % of the entrance pupil diameter		Standard area		Inner area		Outer area	
	outer diam	inner diam	β	γ	β	γ	β	γ
Lyot 1	97,7	36,1	0,86	-0,06	0,84	-0,21	0,01	0,14
Lyot 2	78,2	43,2	0,58	-0,12	0,49	-0,19	0,09	0,07
Lyot 3	88,9	39,7	0,72	-0,08	0,67	-0,21	0,05	0,13



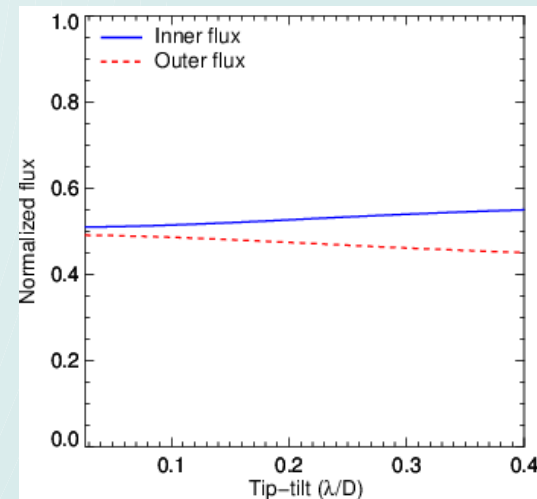
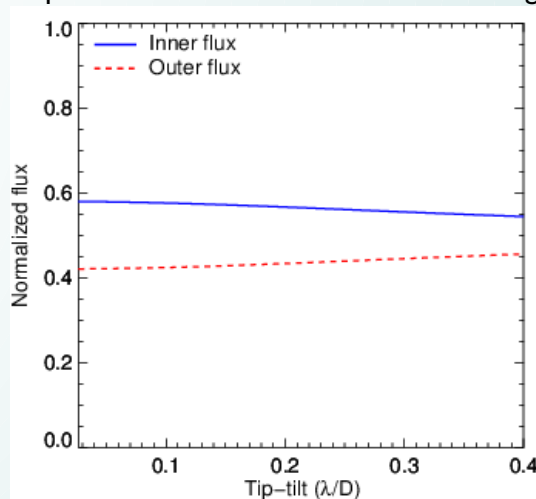
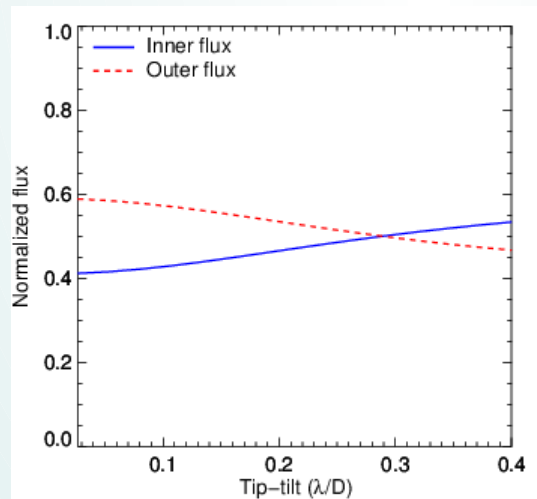
Lyot 1

Lyot 2

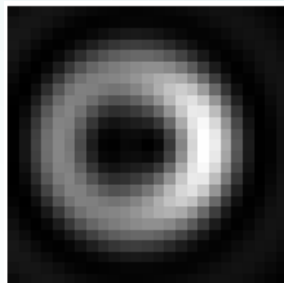
Lyot 3



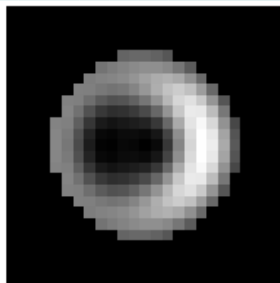
Flux repartition between inner and outer regions



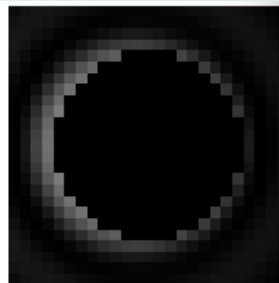
standard



inner

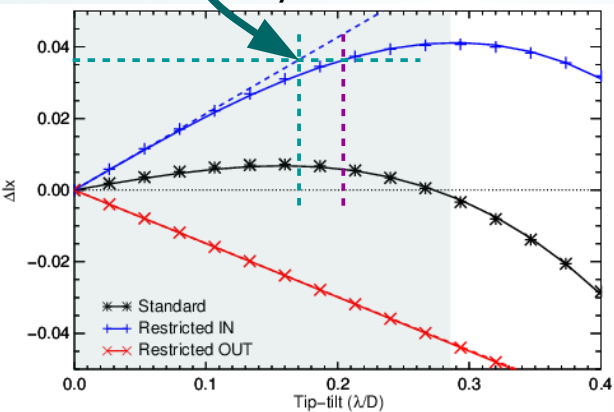


outer

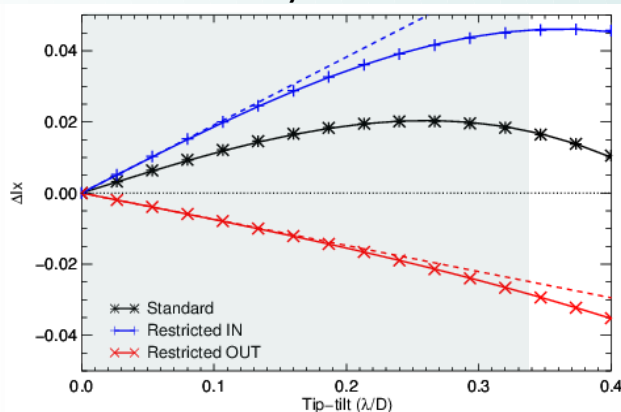


Outside the linear region, the tip-tilt will be underestimated

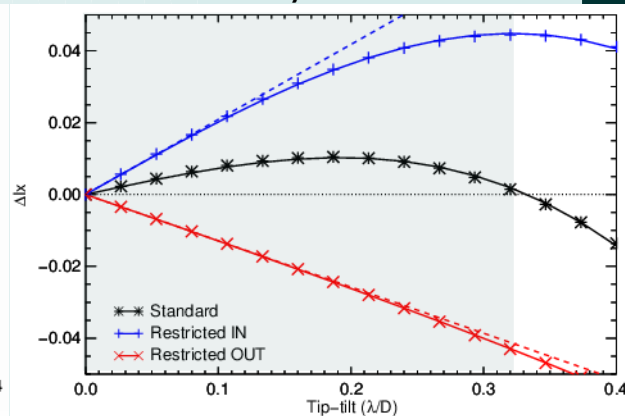
Lyot 1



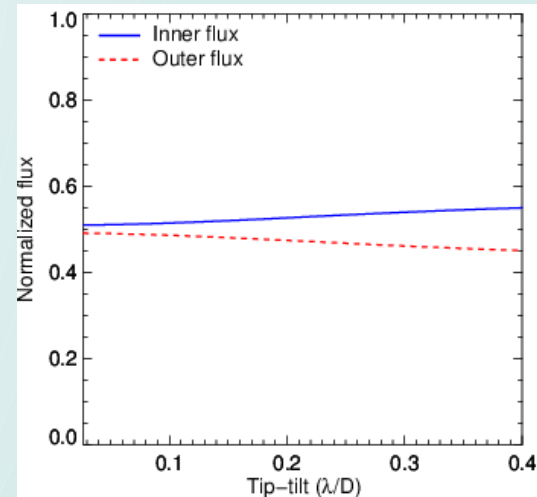
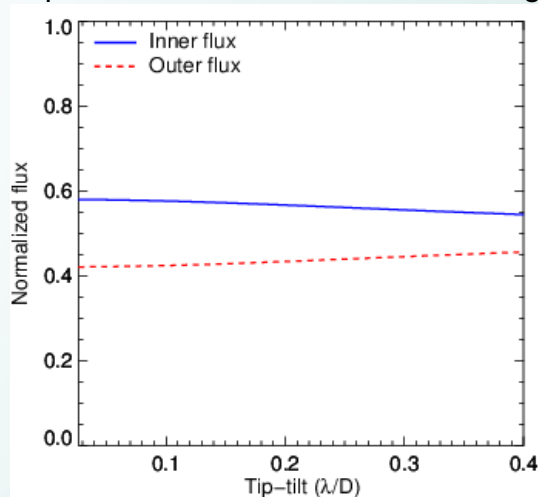
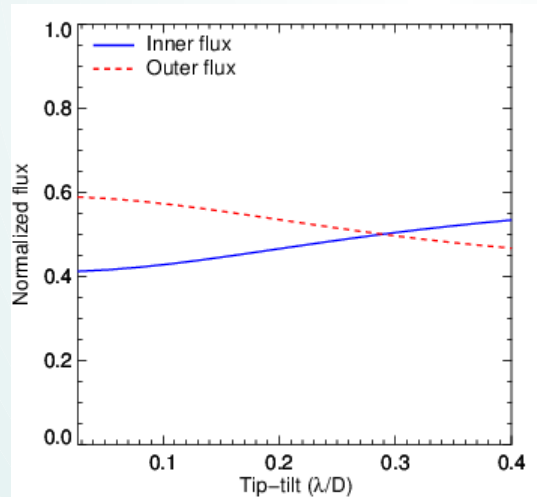
Lyot 2



Lyot 3



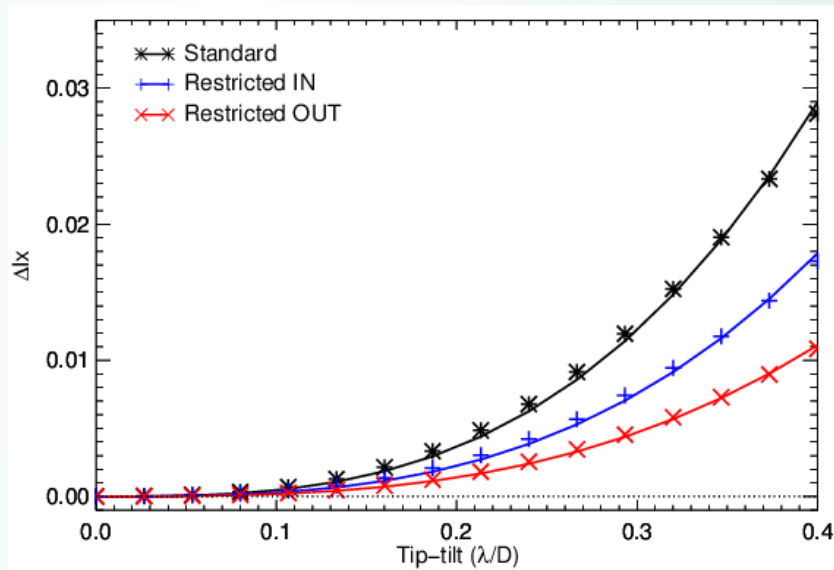
Flux repartition between inner and outer regions



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Model parameters for the Hale telescope – with RAVC

I have made the assumption that the ring apodizer was optimized in throughput
With $r_0 = 36\% \rightarrow r_1 = 67\%$ ($T=71\%$)



$$\begin{cases} t_{1,\text{opt}} = 1 - \frac{1}{4} (R_0^2 + R_0 \sqrt{R_0^2 + 8}) \\ R_{1,\text{opt}} = \frac{R_0}{\sqrt{1-t_{1,\text{opt}}}} \end{cases}$$

Model

$$\Delta I_x = \beta T^3 + \gamma T$$

We should get a model similar to the one without central obstruction \rightarrow we can use the whole image (standard mode)

	Dimensions in % of the entrance pupil diameter		Standard area	
	outer diam	inner diam	β	γ
Lyot 1	97,7	66,9	0,55	0,004
Lyot 2	78,2	66,9	0,37	0,004
Lyot 3	88,9	66,9	0,42	0,003