



THE HYPERTELESCOPE CONCEPT

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Two ways to image the sky:

Interferometers

vs

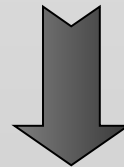
Single telescope



High Angular Resolution
fringes

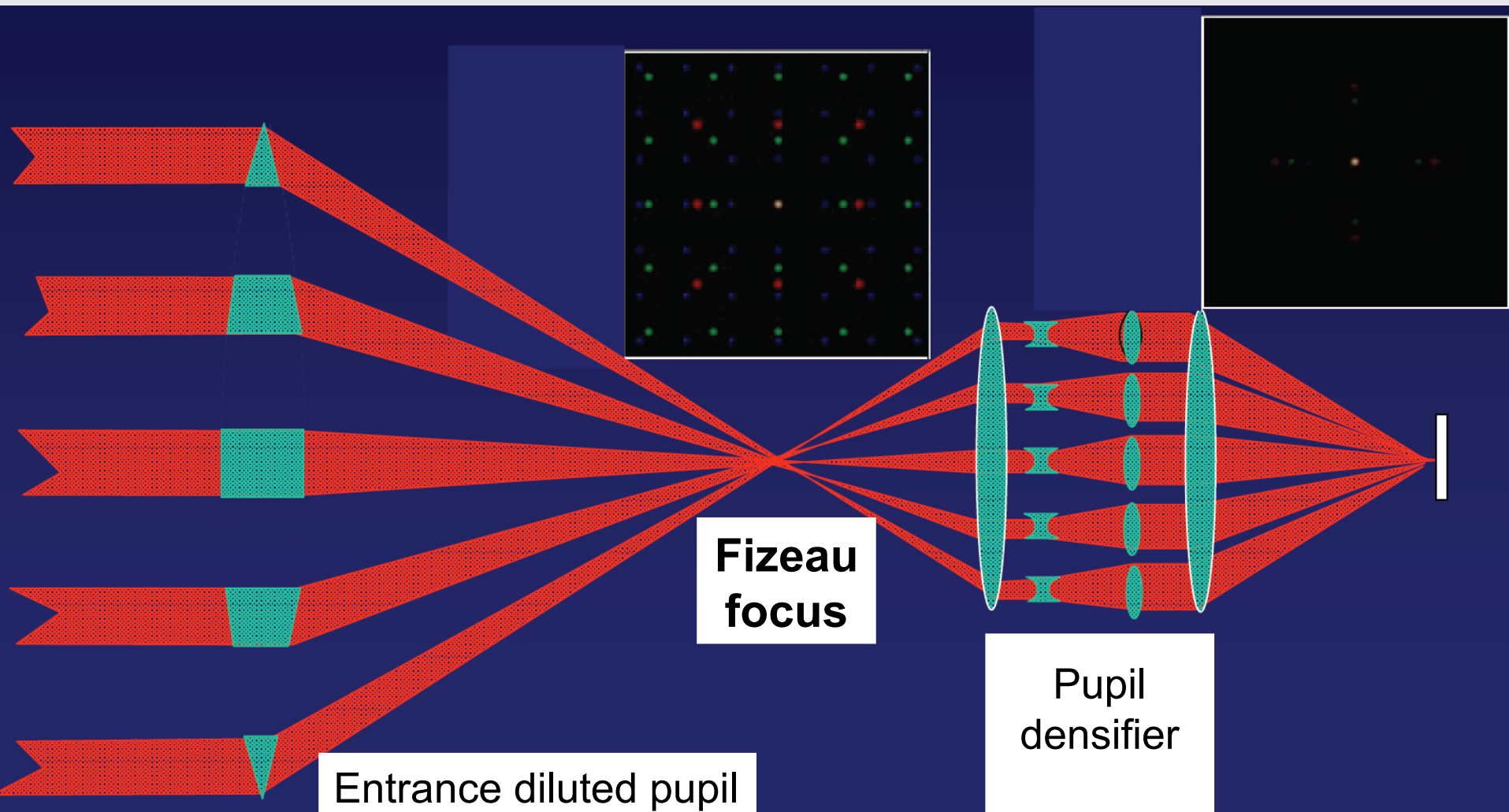


Direct imaging
Diffraction limited

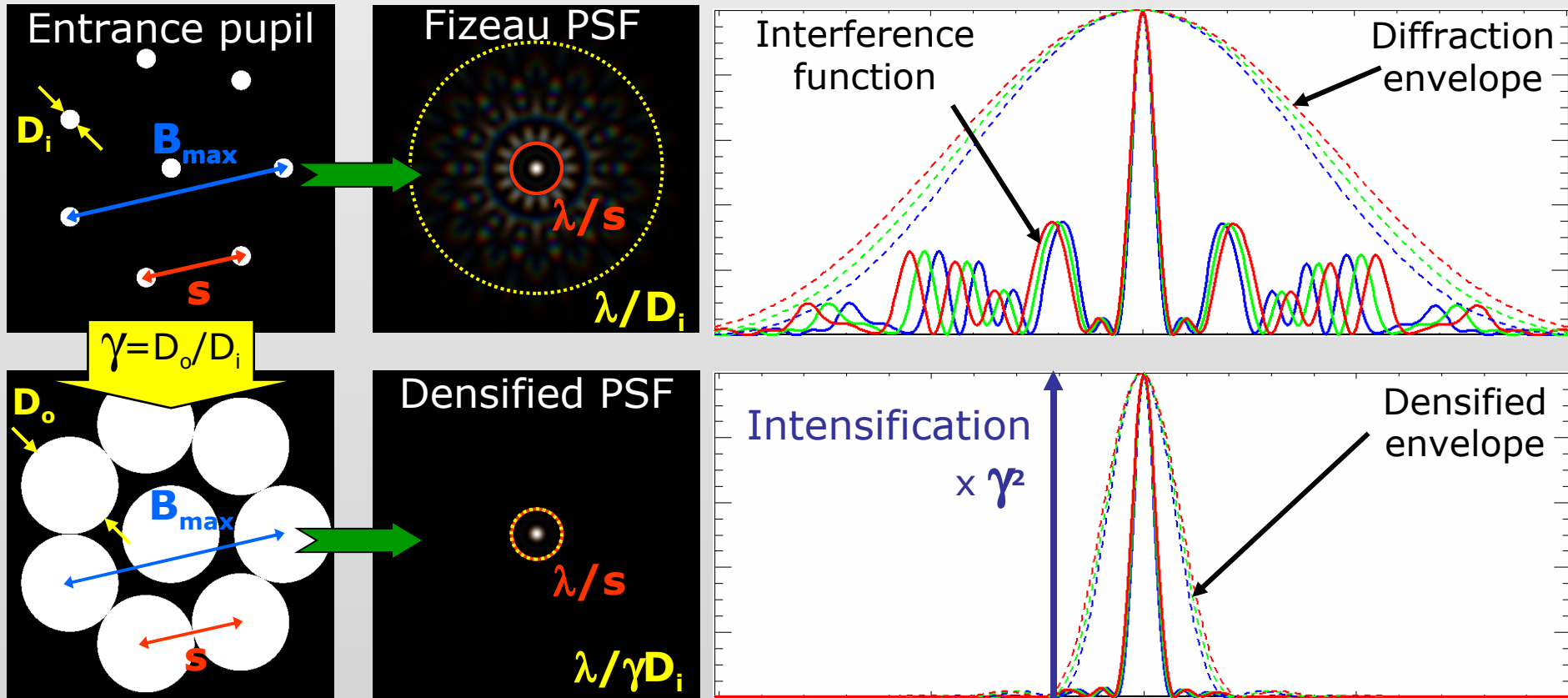


IDEAL: Direct imaging with High resolution
HYPERTELESCOPE CONCEPT

The hypertelescope principle, 1/2



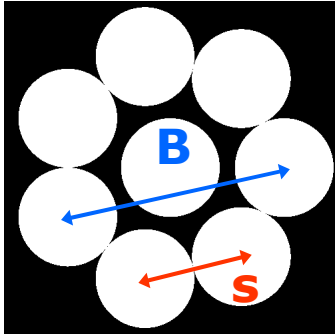
The hypertelescope principle, 2/2



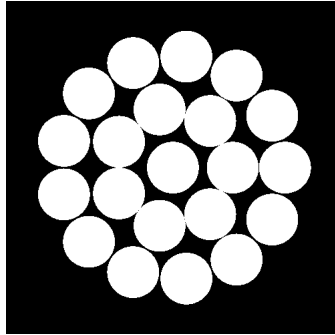
- Clean Field: CLF $\approx \lambda/s$
- Coupled Field : CF = λ/D_i
- Direct Imaging Field : DIF $\approx \lambda/\gamma D_i$

Numerical simulations: complex object

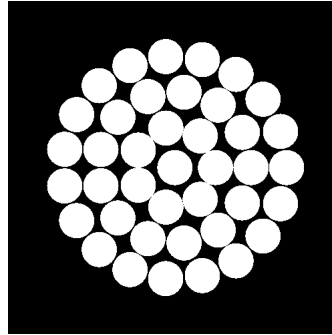
$N_T = 8$



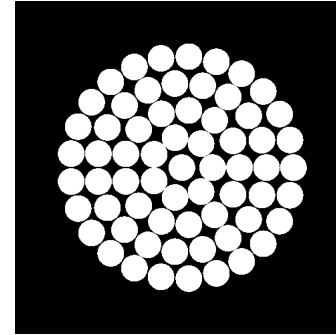
$N_T = 21$



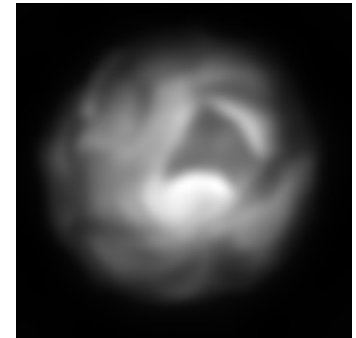
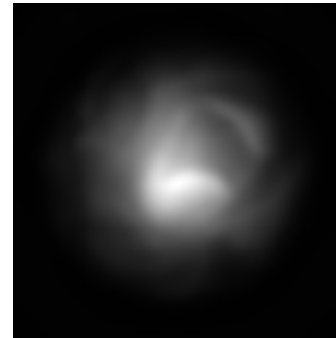
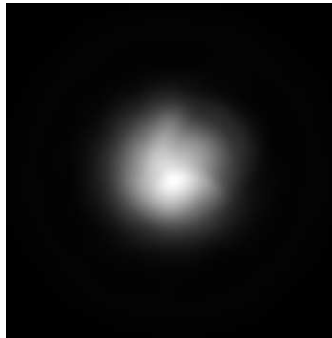
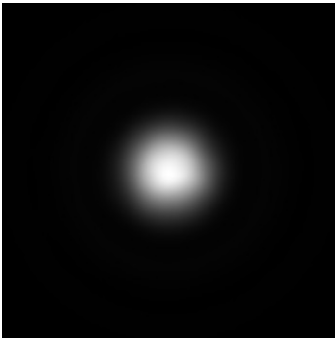
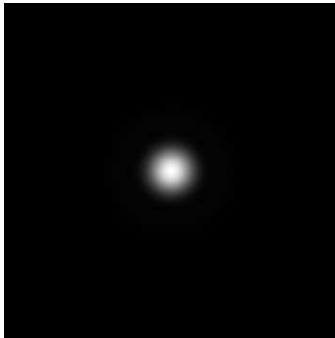
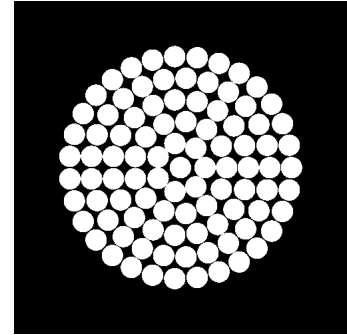
$N_T = 40$



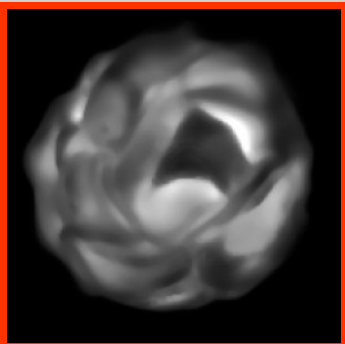
$N_T = 65$



$N_T = 96$



Red giant



- $B = \text{cte}$, N_T increases $\Rightarrow$ s decreases $\Rightarrow$ CLF increases
- Importance of the CLF on choosing the array configuration

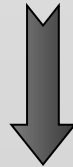
MNRAS 2008, Patru F., Mourard D., Lardi re O.,
Tarmoul N. (submitted)

Conclusion, PhD theme

❖ Next generation of interferometers = **Hypertelescope**

❖ Specifications:

- Large number of telescopes
- Cophasing system *easy* to implement



My PhD:

New cophasing system

Large N_T , whatever the array configuration

... Densifying the VLTi ...