Constraints on Polarization Efficiency in the Vela C: First Results from BLASTPol 2012

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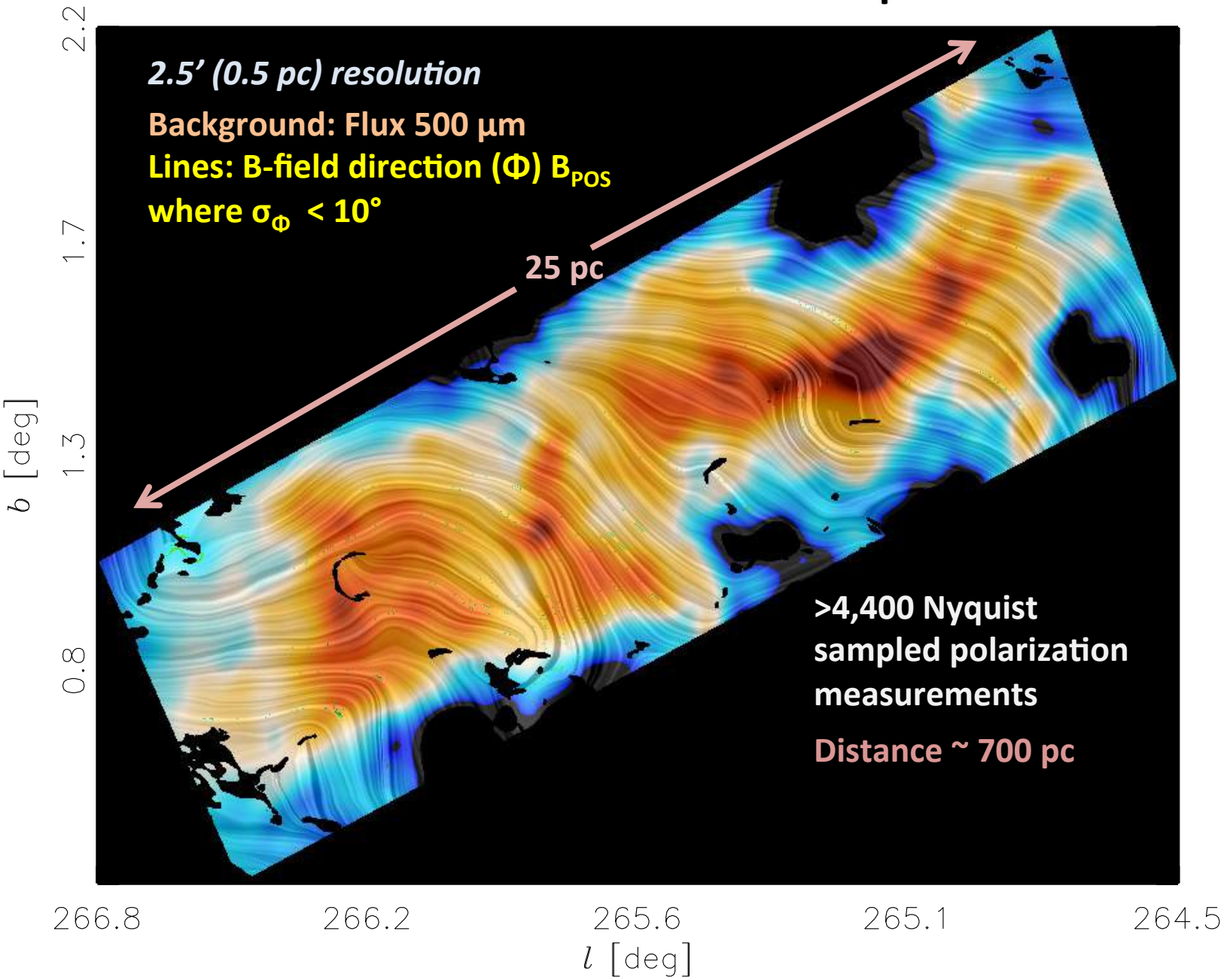
BLASTPol Specs :
Wavebands:
250, 350, 500 μm
Diffraction Limited
Resolution: <1'

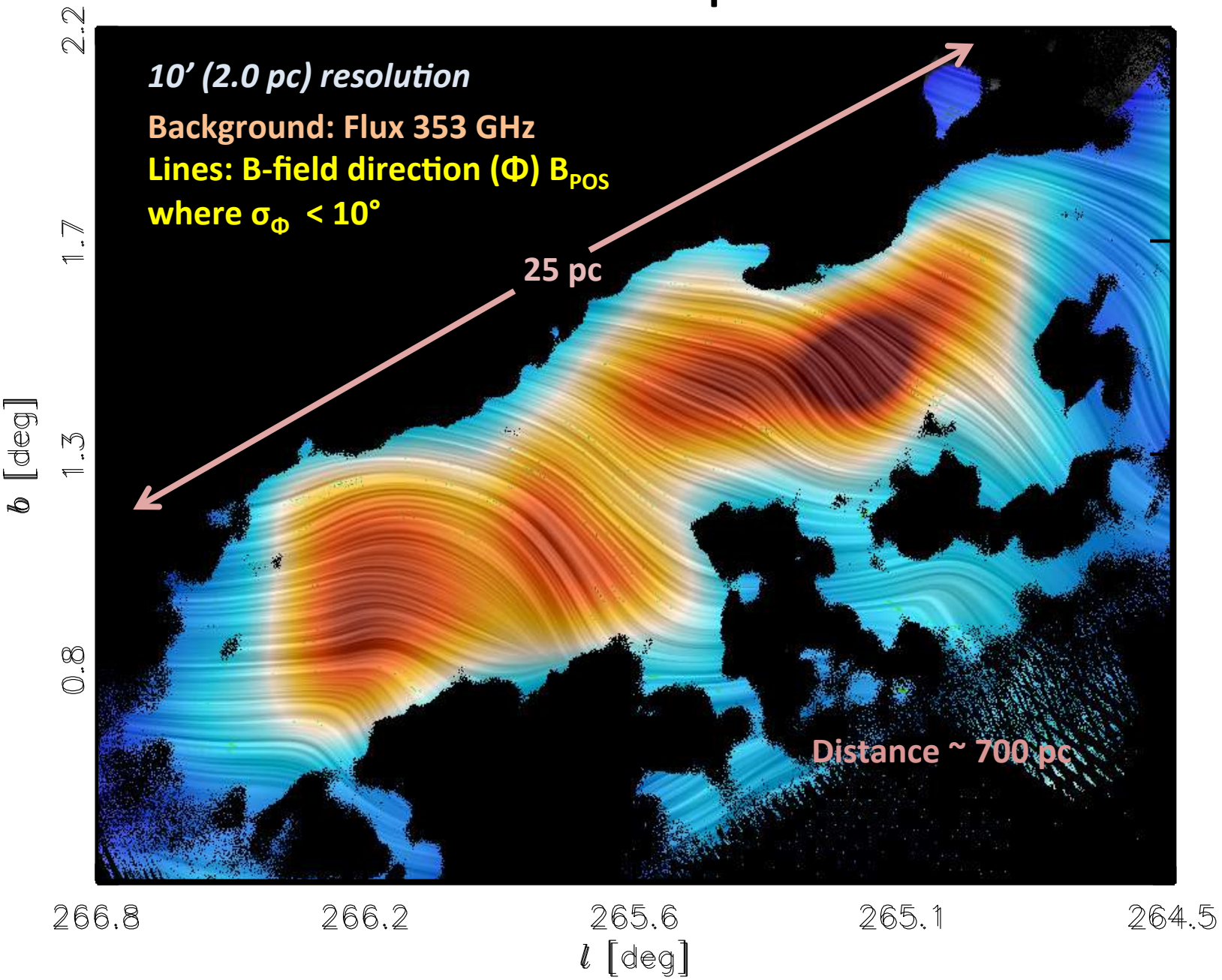
BLAST
Balloon-borne Large-Aperture Sub-millimeter Telescope

NASA
CSA ASC
The Leverhulme Trust
NSERC CRSNG
Science & Technology Facilities Council
CIERA

BLASTPol Inferred B-field Map of Vela C



Planck B-field Map of Vela C



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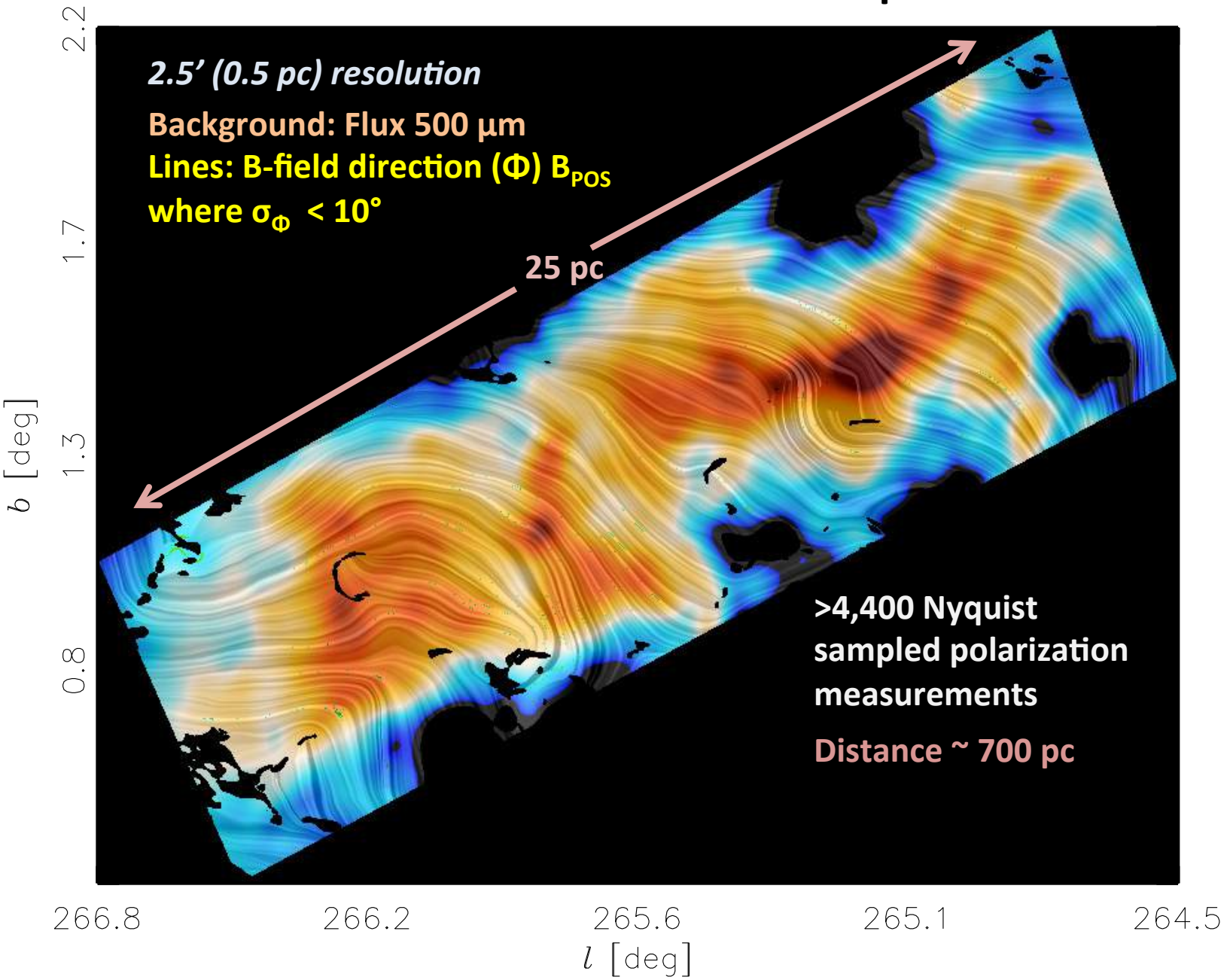


Modeling Polarization in Vela C

Fractional polarization (p)

- Changes in field direction
- Dust physics (grain alignment)

Polarization Angle Dispersion (S) on 0.5 pc scales

- Sharp changes in the B-Field direction

Column Density (N)

Two-variable power-law fit:

$p = p_0 N^{-0.4} S^{-0.6}$

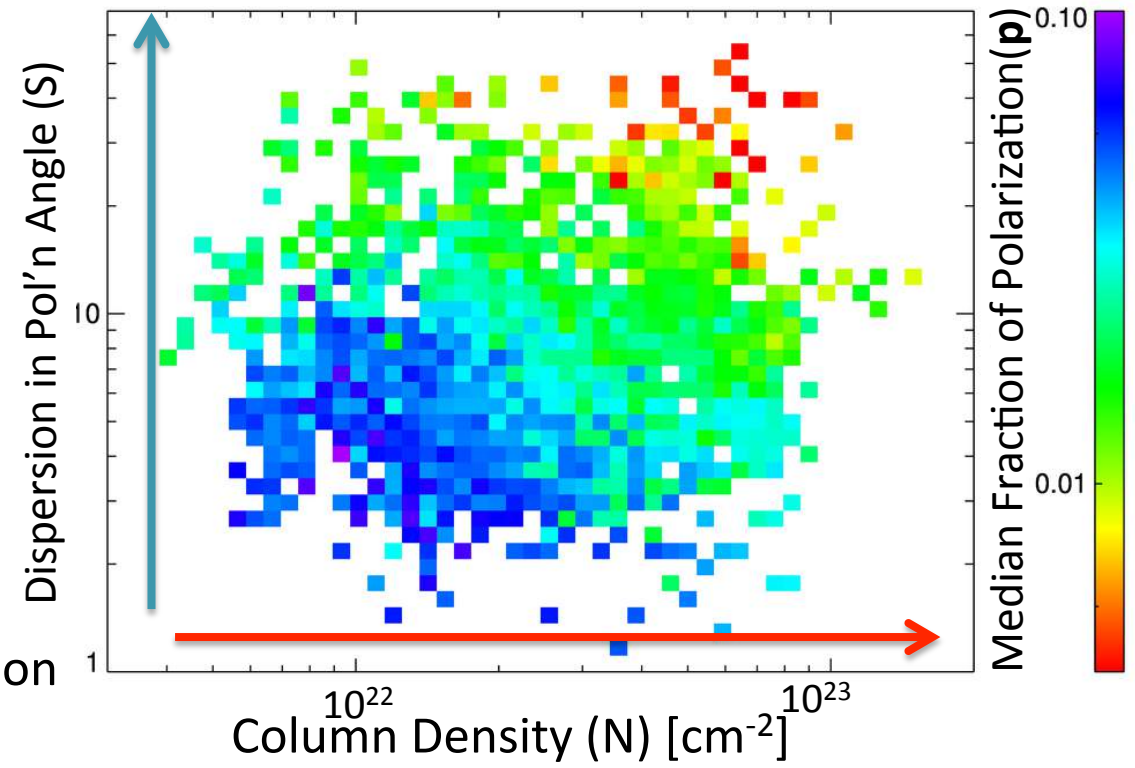
Results:

- Compare to synthetic polarization data (*test numerical MHD, molecular cloud models*)
- Limits on dust grain alignment
  - *Are we sensitive to B-Field direction changes deep within molecular clouds?*

…see my poster for details!

p decreases with **S**

- *B-field direction changes within beam*



p decreases as **N** increases

- *grain alignment less efficient at high N, OR more B-field disorder at high N?*

BLAST:The Next Generation

- New Detector Arrays
  - ***~16x increase in mapping speed***
- Larger Primary Mirror
  - 2.5 m gives 22'' resolution @ 250 microns
  - ***~6x increase in resolution***
- 30 day hold time cryostat
  - ***~3x longer than BLASTPol***

First Antarctic Flight Dec 2016:

- Detailed maps of magnetic morphology for dozens of clouds
  - Better statistical comparison with numerical simulations
- ***25% of the time available for shared risk observations!***