KELT-9b AS A PREVIEW OF THE ELT ERA

Probing 3D dynamics and thermochemical regimes with GIARPS

A. di Paola – M. Brogi – P. Giacobbe
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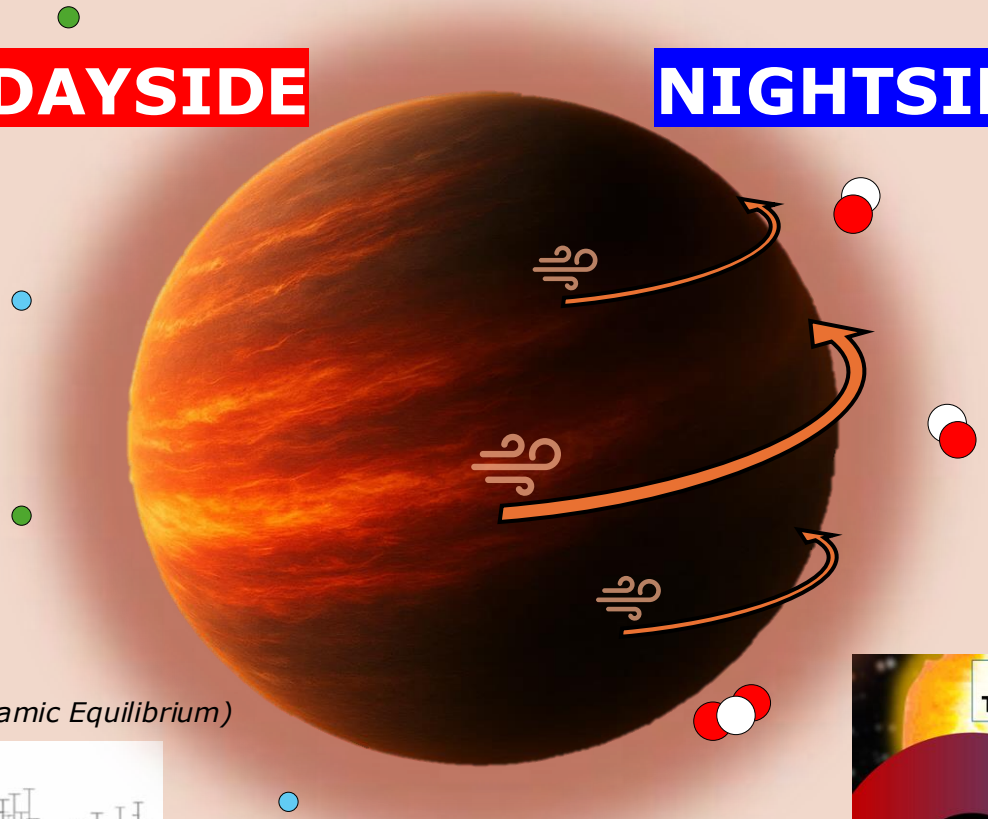
ULTRA HOT JUPITERS

T > 2000 K
Tidally locked: hot dayside, cooler nightside
Strong temperature contrast



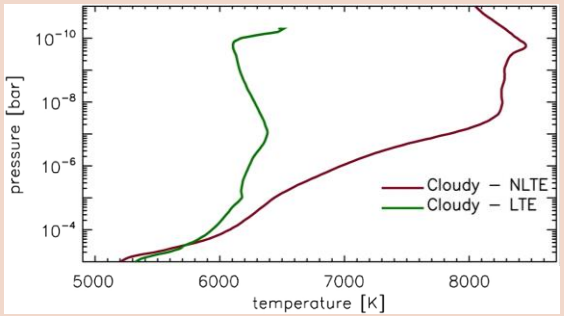
KELT-9 b case

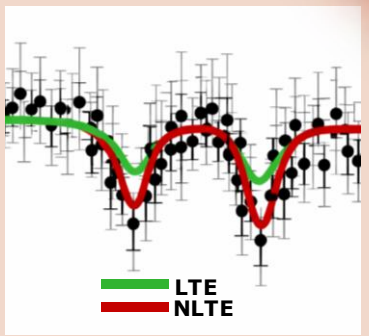
Mass: 2.9 M_J
Radius: 1.9 R_J
Orbital period: 1.5 days
T_{eq}: ~ 4000 K

LOCAL COMPLEXITY

Low gas density
High stellar irradiation
Rare collisions

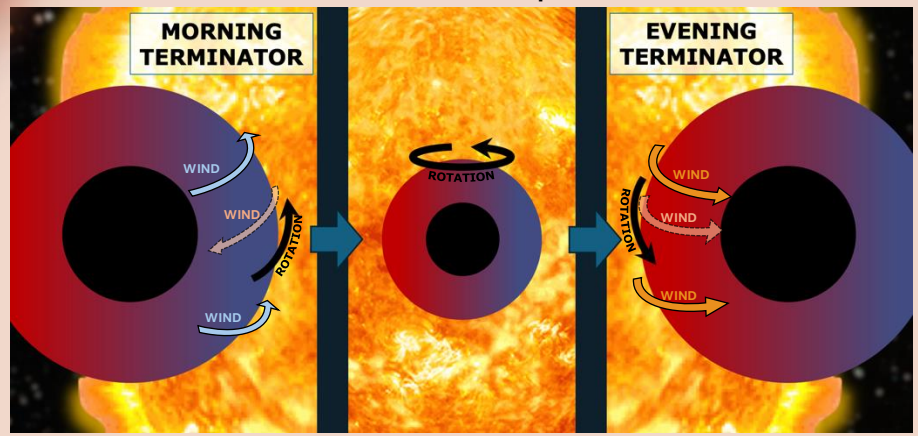
→ **NLTE**
(Non Local Thermodynamic Equilibrium)





GLOBAL COMPLEXITY

Terminators temperature gradient
Dayside expansion
Differential atmospheric circulation



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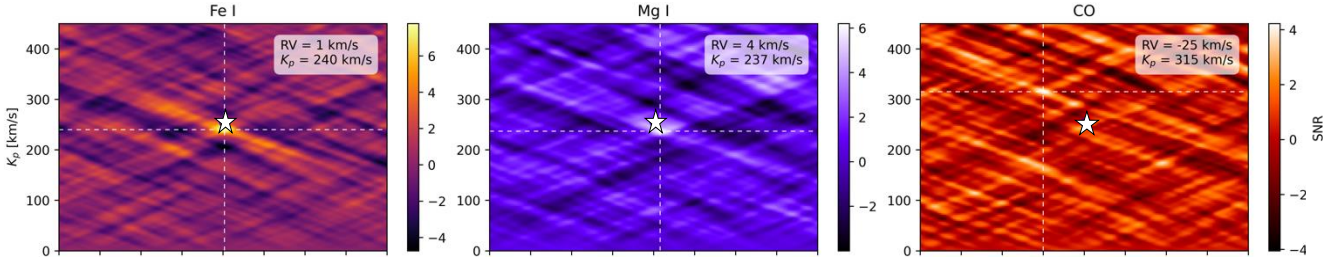
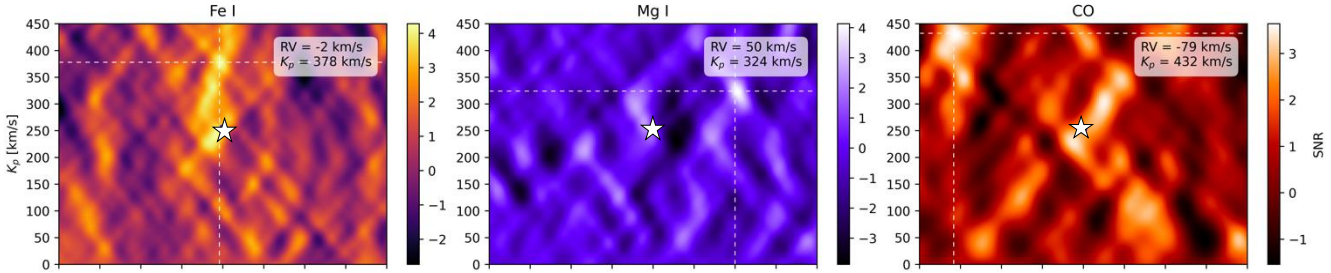
CROSS-CORRELATION MAPS

GIANO-B data

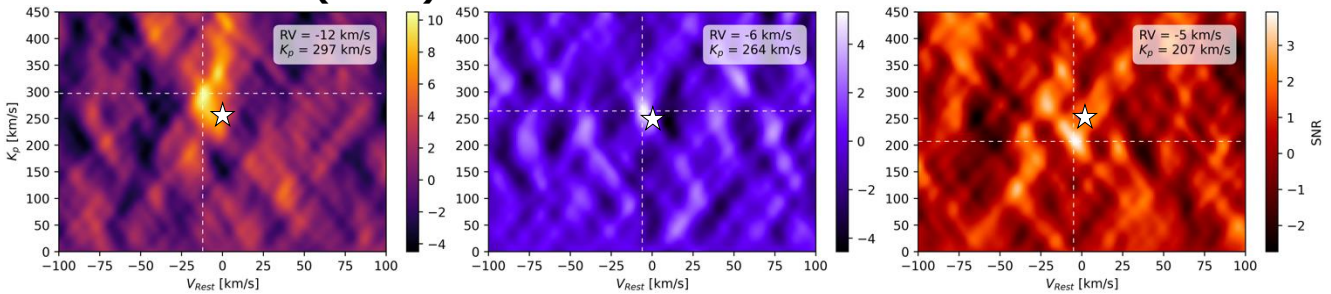
EMISSION



TRANSMISSION (LTE)



TRANSMISSION (NLTE)



di Paola et al. (in prep.)

KELT-9 b case

Mass: 2.9 M_J

Radius: 1.9 R_J

Orbital period: 1.5 days

T_{eq}: ~ 4000 K

HARPS-N
GIANO-B

ANDES

Methodology used for 3.6m telescopes is the same that will be used for ELT

Solving the challenges of UHJs is a key step in moving to the characterisation ever smaller planets.

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