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NLTE effects in the atmosphere of the ultra-hot Jupiter KELT-9b

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Ultra-hot Jupiters (UHJs) have become prime targets for atmospheric characterisation. KELT-9b is the hottest of the known UHJs and both hydrogen Balmer lines and metal line features have been detected in the planetary transmission spectrum. I will show how NLTE effects drive the temperature pressure structure of KELT-9b's atmosphere and that NLTE effects must be taken into account in order to reproduce the observations. I will show how our NLTE models have enabled the direct observational detection of NLTE effects in the atmosphere of KELT-9b at the position of both hydrogen and metal line features. Finally, I will show that the NLTE models further place strong constraints on velocities in the planetary atmosphere.

Primary author: FOSSATI, Luca

Co-authors: Dr YOUNG, Mitchell (University of Oxford); Dr SHULYAK, Denis (Instituto de Astrofísica de Andalucía); Prof. KOSKINEN, Tommi (University of Arizona); Dr BORSA, Francesco (INAF Brera)

Presenter: Dr YOUNG, Mitchell (University of Oxford)

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