DAMIEN GAYET

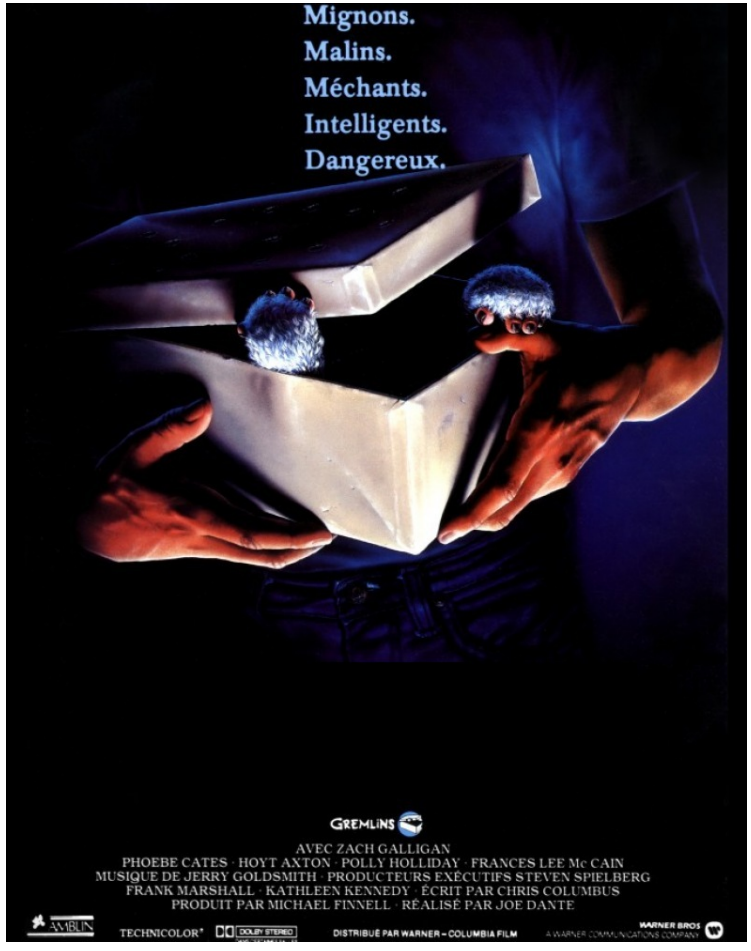
Université de
Grenoble

CHAOS

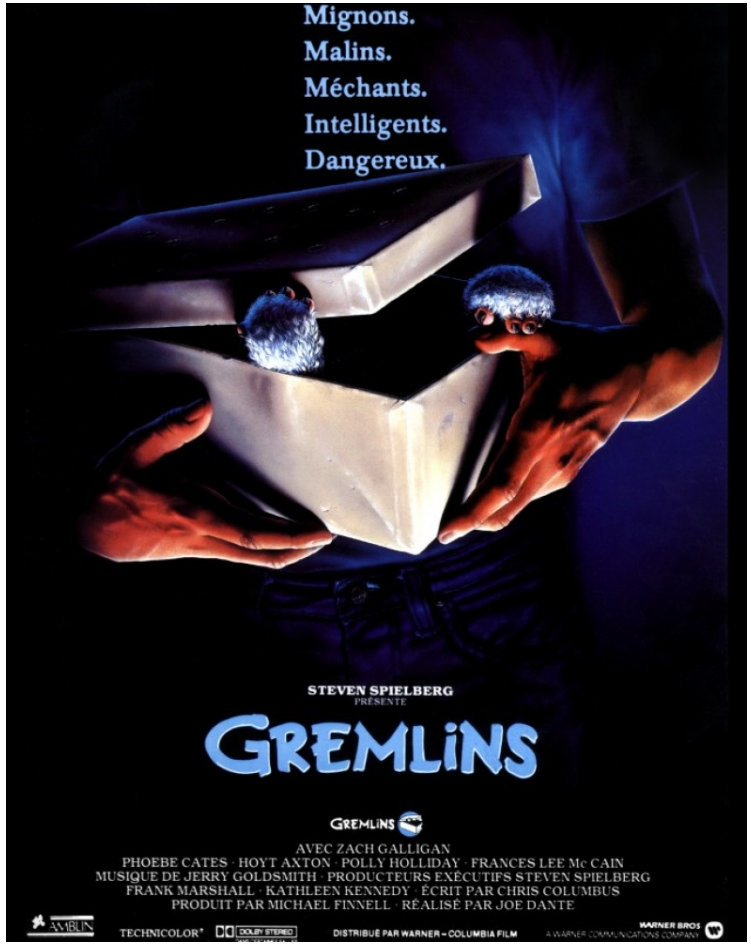
ENSATT

21 mars 2014

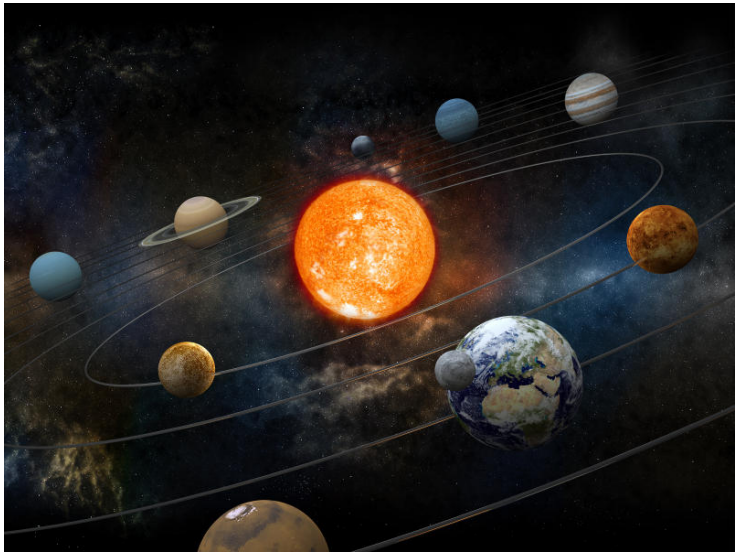
Acte II - **Les problèmes**

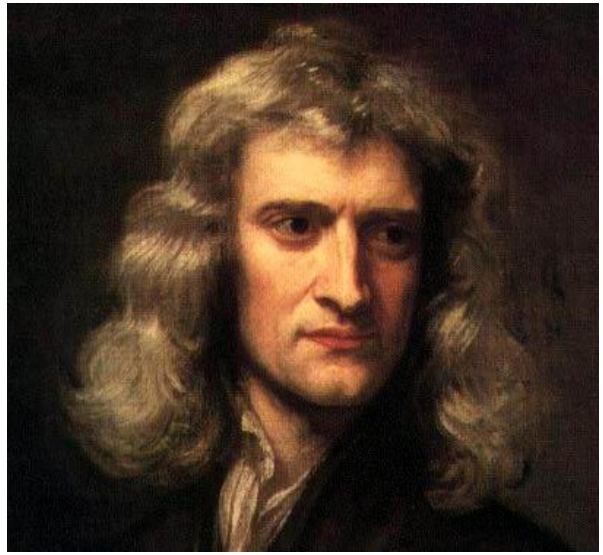


Acte II - **Les problèmes**



Film *Laskar 1*

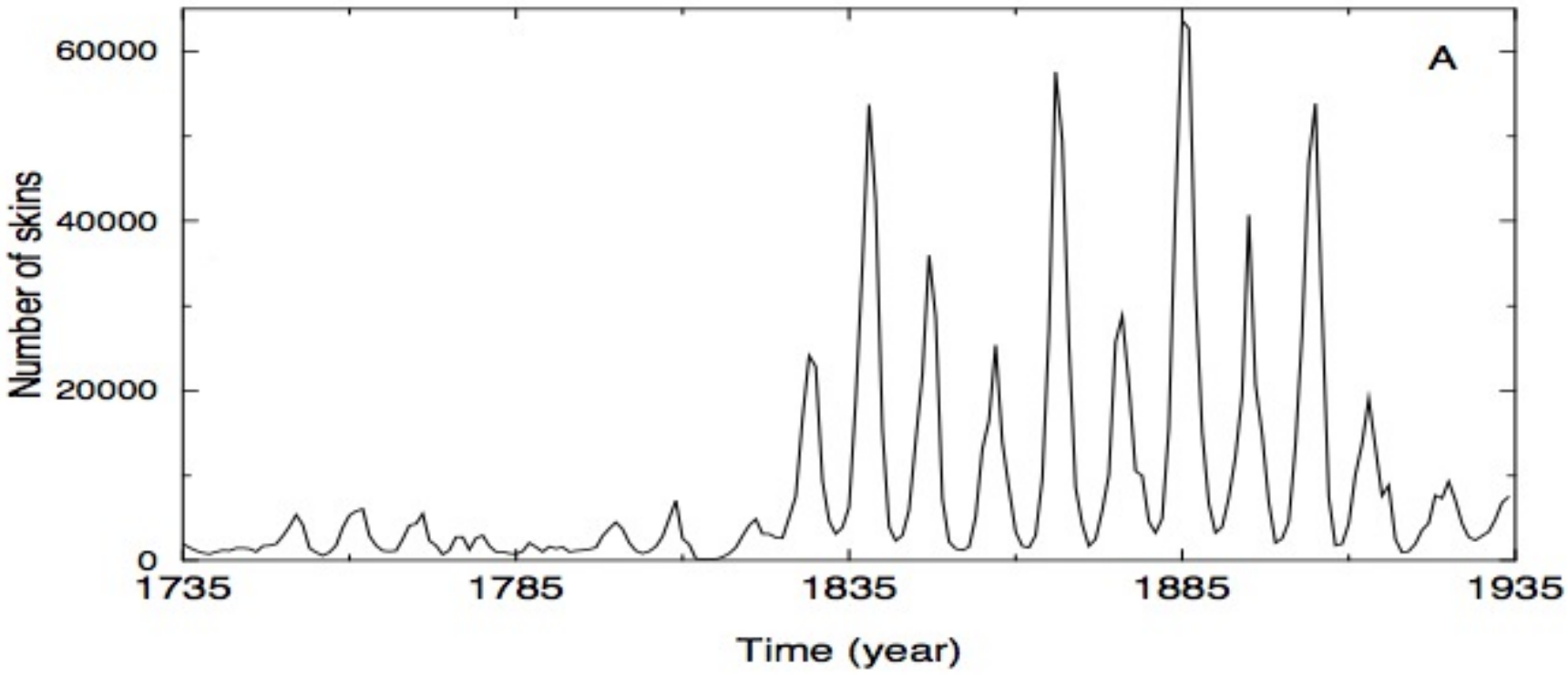




Car tandis que les Comètes se meuvent sur des orbes très excentriques dans toutes sortes de positions, la nécessité aveugle n'aurait jamais pu obliger toutes les planètes à se mouvoir dans une seule et même direction sur des orbes concentriques, exception faite pour quelques irrégularités inconsidérables qui peuvent avoir été produites par l'action mutuelle des comètes et des planètes les unes sur les autres, qui sont aptes à croître, jusqu'à ce que ce système ait besoin d'une reformation. Une telle uniformité admirable dans le système planétaire doit être comprise comme l'effet d'un choix.

Newton, Traité d'optique, 1704

La double valse du lynx


A
60000
40000
20000
0
Number of skins
1735
1785
1835
1885
1935
Time (year)

La mélancolie des planètes errantes

CFBDSIR2149-0403: a 4-7 Jupiter-mass free-floating planet in the young moving group AB Doradus ? ⋆

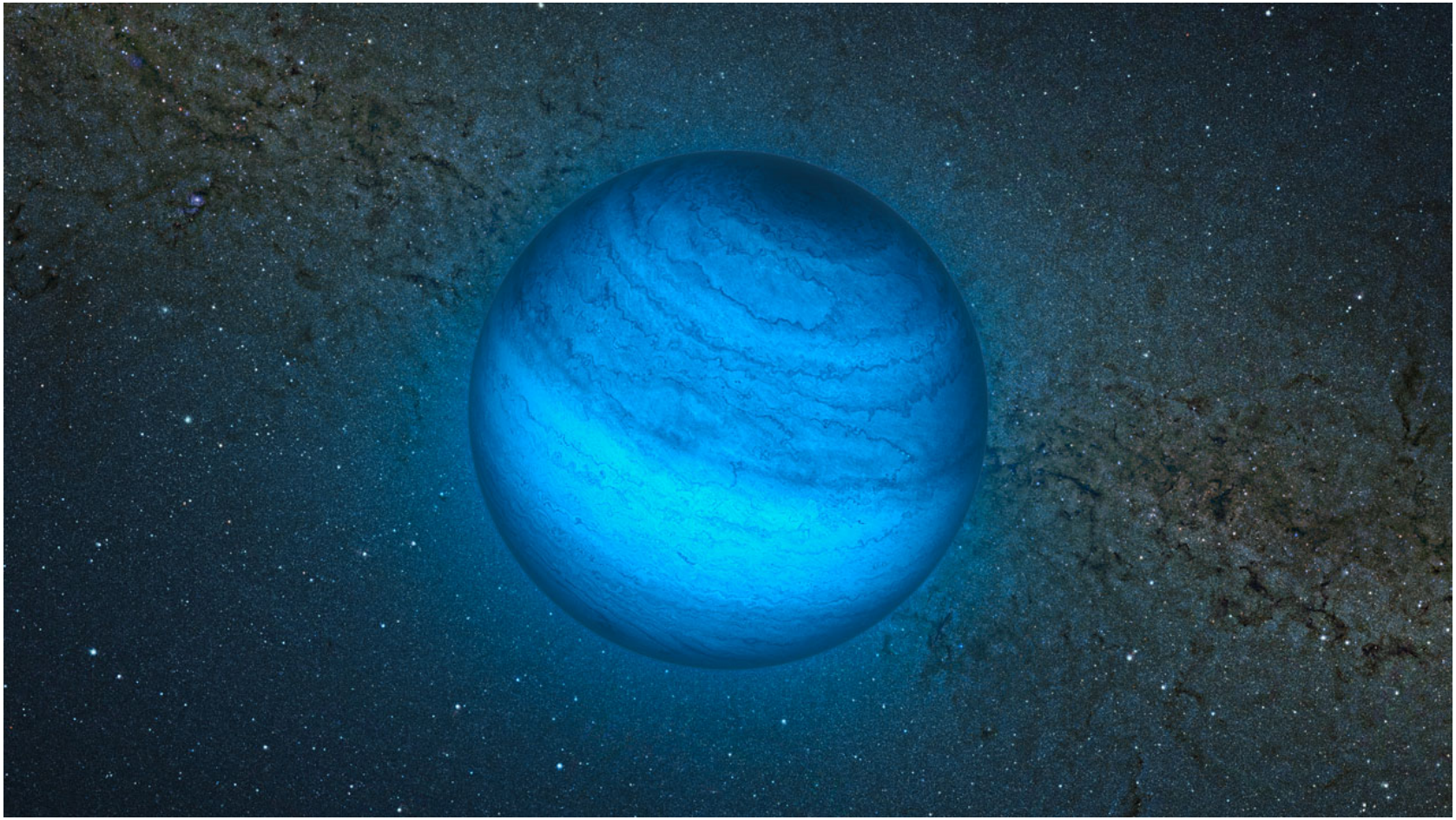
P. Delorme[1] J. Gagné[2] L. Malo[2] C. Reylé[3] E. Artigau[2] L. Albert[2] T. Forveille[1] X. Delfosse[1] F. Allard[4] D. Homeier[4]

[1] UJF-Grenoble 1 / CNRS-INSU, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG) UMR 5274, Grenoble, F-38041, France.
[2] Département de physique and Observatoire du Mont Mégantic, Université de Montréal, C.P. 6128, Succursale Centre-Ville, Montréal, QC H3C 3J7, Canada
[3] Université de Franche Comté, Institut UTINAM CNRS 6213, Observatoire des Sciences de l'Univers THETA de Franche-Comté, Observatoire de Besançon, BP 1615, 25010 Besançon Cedex, France
[4] C.R.A.L. (UMR 5574 CNRS), Ecole Normale Supérieure, 69364 Lyon Cedex 07, France

ABSTRACT

Aims. Using the CFBDSIR wide field survey for brown dwarfs, we identified CFBDSIRJ214947.2-040308.9, a late T dwarf with atypically red $J - K_S$ colour.
Methods. We obtained an X-Shooter spectra, with signal detectable from 0.8 μm to 2.3 μm, which confirmed a T7 spectral type with an enhanced K_s-band flux indicative of a potentially low-gravity, young, object.
Results. The comparison of our near infrared spectrum with atmosphere models, for solar metallicity, shows that CFBDSIRJ214947.2-040308.9 is probably a 650-750 K, log g=3.75-4.0 substellar object. Using evolution models, this translates into a planetary mass object, with an age in the 20-200 Myr range. An independent Bayesian analysis from proper motion measurements results in a 87% probability that this free-floating planet is a member of the 50-120 Myr old AB Doradus moving group, which strengthens the spectroscopic youth diagnosis.
Conclusions. By combining our atmospheric characterisation with the age and metallicity constraints arising from the probable membership to the AB Doradus moving group, we find that CFBDSIRJ214947.2-040308.9 is probably a 4-7 Jupiter masses free-floating planet with an effective temperature of ∼700 K and a log g of ∼4.0, typical of the late T-type exoplanets that are targeted by direct imaging. We stress that this object could be used as a benchmark for understanding the physics of the similar T-type exoplanets that will be discovered by the upcoming high contrast imagers.

old AB Doradus moving group, which str
Conclusions. By combining our atmosphe
probable membership to the AB Doradus
Jupiter masses free-floating planet with
T-type exoplanets that are targeted by d
understanding the physics of the similar
imagers.



CFBDSIR J214947.2-040308.9