

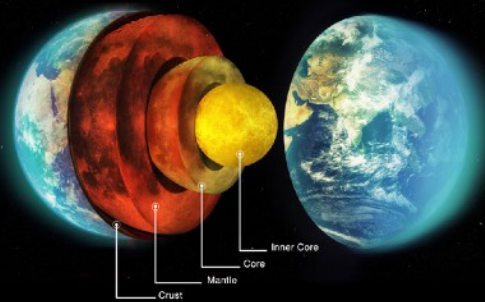
Probing the Shapes of Planets



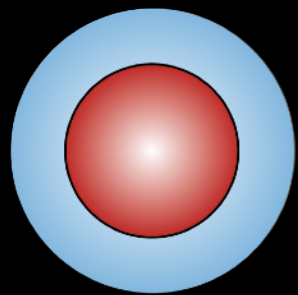
Tiger Lu, Gregory Laughlin

Yale University

Why do we care?



k_2 tells us a lot!



Do planets have cores?

➤ Planet formation!

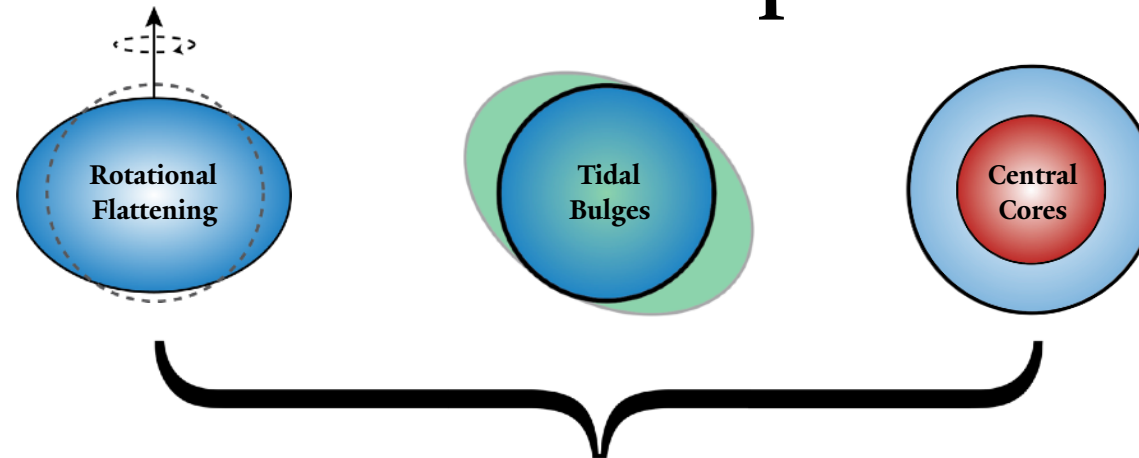
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4	Na	Mg	Al
5	K	Ca	Sc
6	Rb	Sr	Y
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What are planets made of?

➤ What do they look like?

➤ Could there be life?

Planets are not perfect!



Describe with "Love Number" k_2

Perfect Sphere



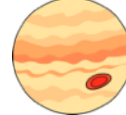
$k_2=0$

Earth



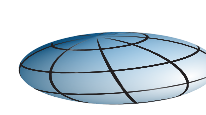
0.31

Jupiter



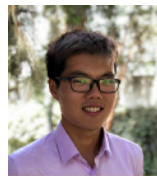
0.57

Really Weird...



1

About Me



I'm Tiger Lu, a third year PhD student studying planets around other stars with Professor Greg Laughlin.

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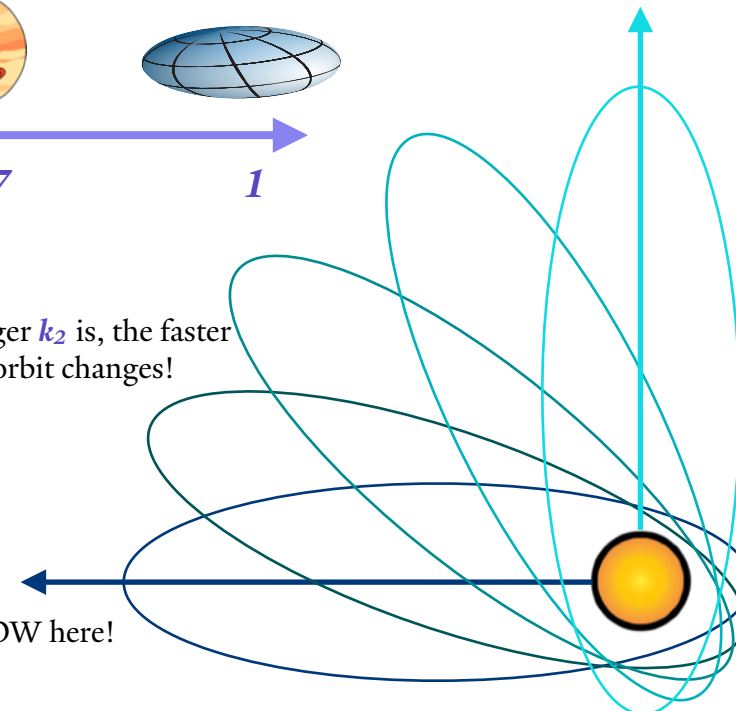
References

- [1] Mardling, 2010. MNRAS, 407, 1048
- [2] Ragozzine & Wolf, 2019. ApJ, 698, 1778
- [3] Lainey et. al, 2017. Icarus, 281, 286
- [4] Lu & Laughlin, in prep



The bigger k_2 is, the faster the orbit changes!

SLOW here!

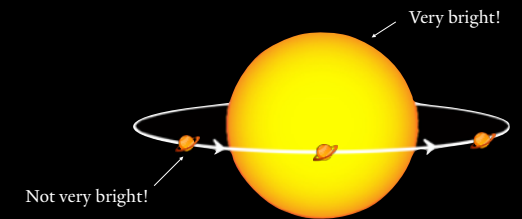


and FAST here!

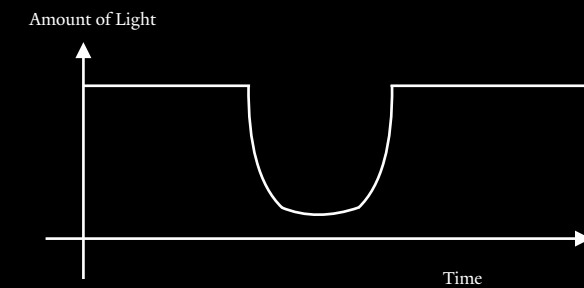
You are here!



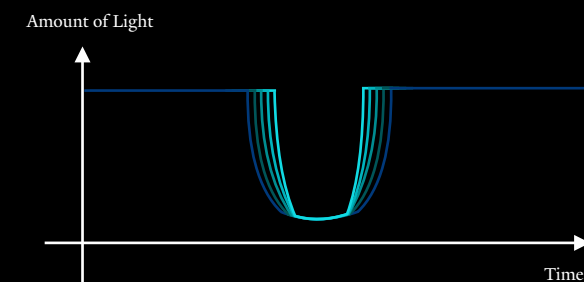
Measuring k_2



We use *transit lightcurves*



As we approach *perihelion*, transits are shorter!



High k_2

➤ Transit shape changes faster!

Currently...

We are measuring k_2 for many known planets, to get a better sense of their structure & shape.