OmegaTranS

National PIs:

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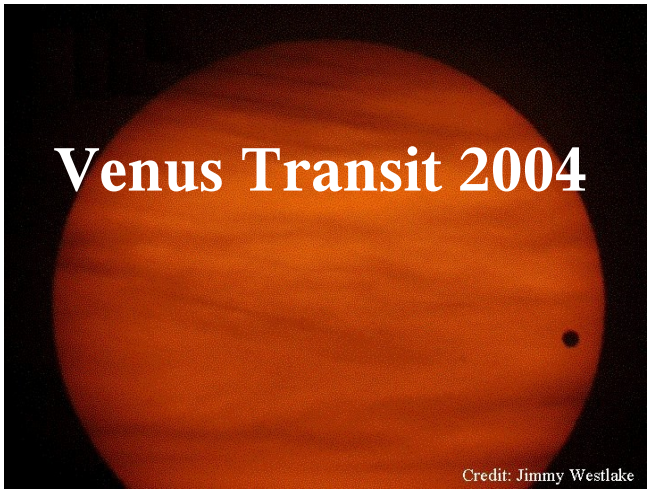
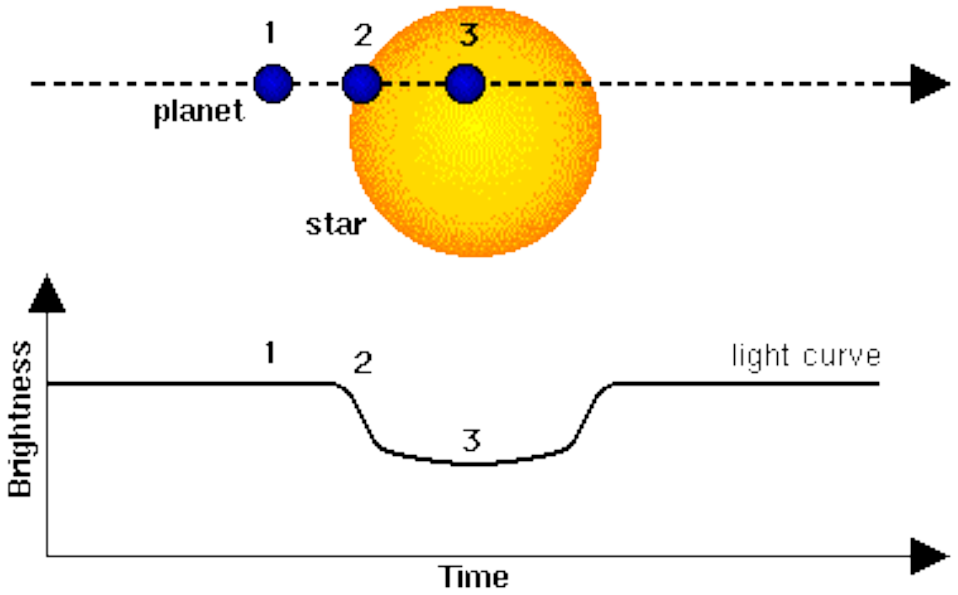
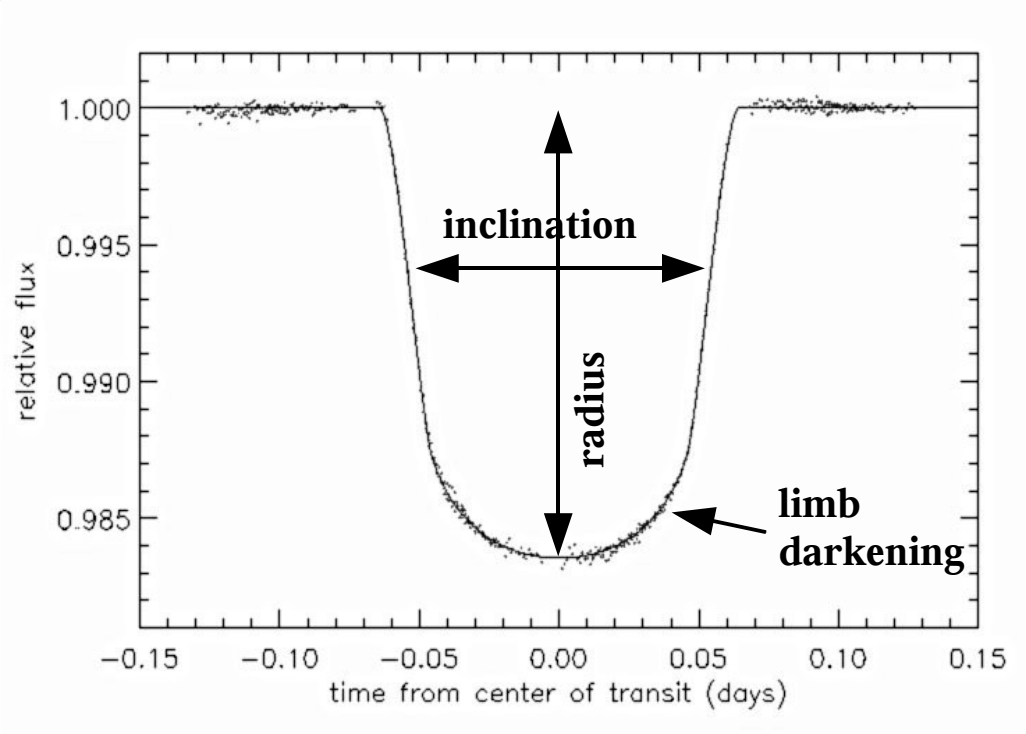
http://www.astro-wise.org/OMEGATRANS

The Transit Method

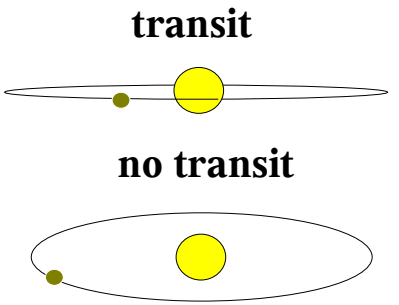


If a planet's orbit is (nearly) edge-on as seen from Earth one can see a periodic dimming in the host star's brightness.



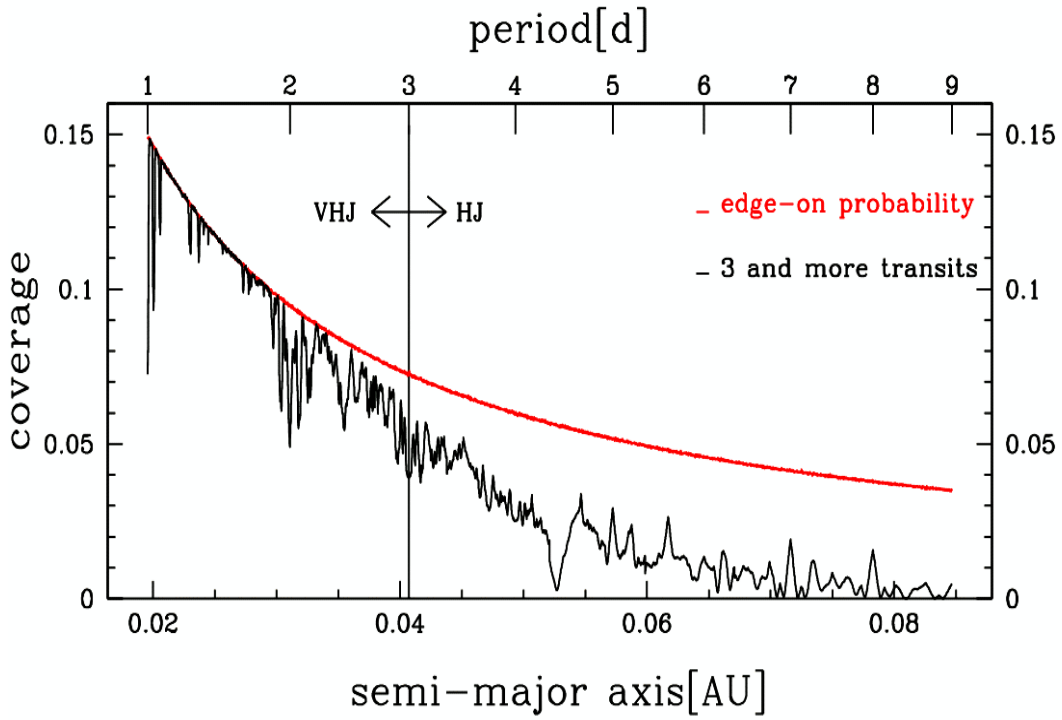


some important formulae:



		Earth	Jupiter
$\Delta F/F$	$\sim (R_{pl}/R_{star})^2$	0.01%	1.0%
$p_{edge\text{-}on}$	$\sim a^{-1}$	0.46%	0.09%
P	$\sim a^{3/2}$	1 yr	11.9 yr
$t_{Transit}$	$\sim a^{1/2}$	13 h	30 h
q_{max}	$\sim a^{-1}$	0.002	0.001

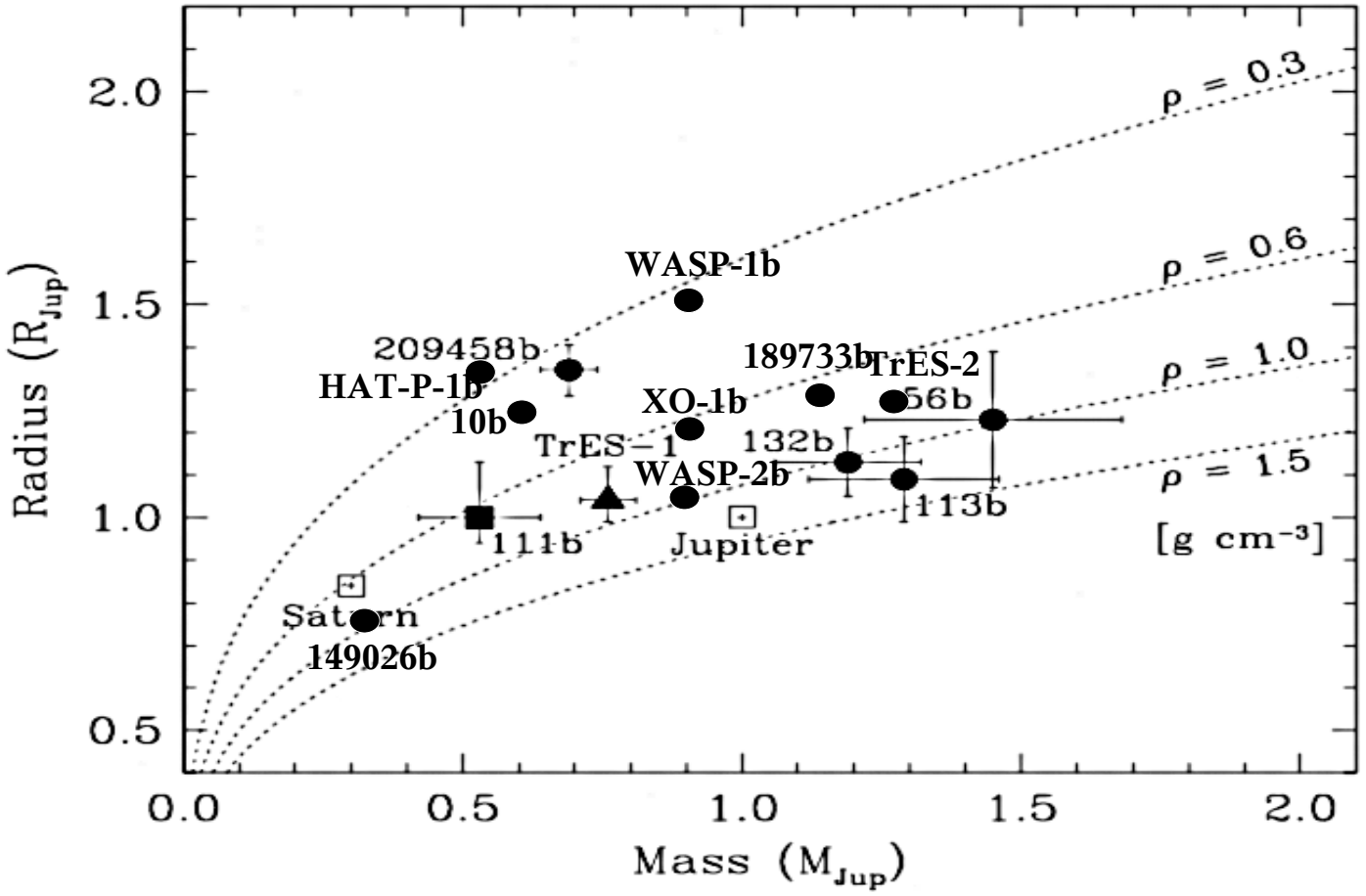
close-in planets are favored in two senses



simulated for a 25 nights campaign

Masses and Radii of the Transiting Planets:

p = 1.2...4.5 days



OmegaTranS will detect 10-15 new planets per year!

OmegaTranS - overview:

sloan r-band, 13.5 - 17.5 mag

5 fields => ~120.000 F-, G- & K-dwarfs, ~500.000 stars in total

25+ GTO-nights / yr (mainly bright time)

exposure time: ~20s, readout time: ~50s

~12.000 science images => 6 TByte raw science data

ingestion: ~200 days on a single computer !!!

estimated total computation time: ~36 days on a 32 cpu cluster

Is the system ready to handle the OmegaTranS dataflow?

1. dpu-tuning

2. data storage

3. saving the lightcurves

1 dpu-tuning

- it should be possible to reduce a high number (>500) of frames as on job
- if the reduction of one Frame breaks with an error the dpu should continue with remaining frames
- already stored and commited data should be deleted immediately on the nodes
- job identifier should be listed on the dpu-status page

2 data storage

6 TByte raw data	=>	16 TByte RawScience
		+ 3 TByte .bz2 data
		+ 12 TByte ReducedScience
		+ 12 TByte WeightFrame
		+ 12 TByte RegriddedFrame
		+ 12 TByte RegriddedWeightFrame
		67 TByte Total

possible solution:

add a flag “is_deleted” and a method “recreate()” which rebuilds the deleted file using informations stored in DB

3 saving the lightcurves

OmegaTranS will produce 500.000 lightcurves
with ~2500 datapoints each

~10-20 entries: JD, flux and error, ...

4 Byte per entries => 50-100 GByte

Too much to store them as as meta data?

Saving FITS-tables?