

KMTNet (Korea Microlensing Telescope Network) Project

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Project Abstract

□ Object

Massive search for extrasolar planets including Earth-mass planets and below by using the microlensing method

□ Three key factors

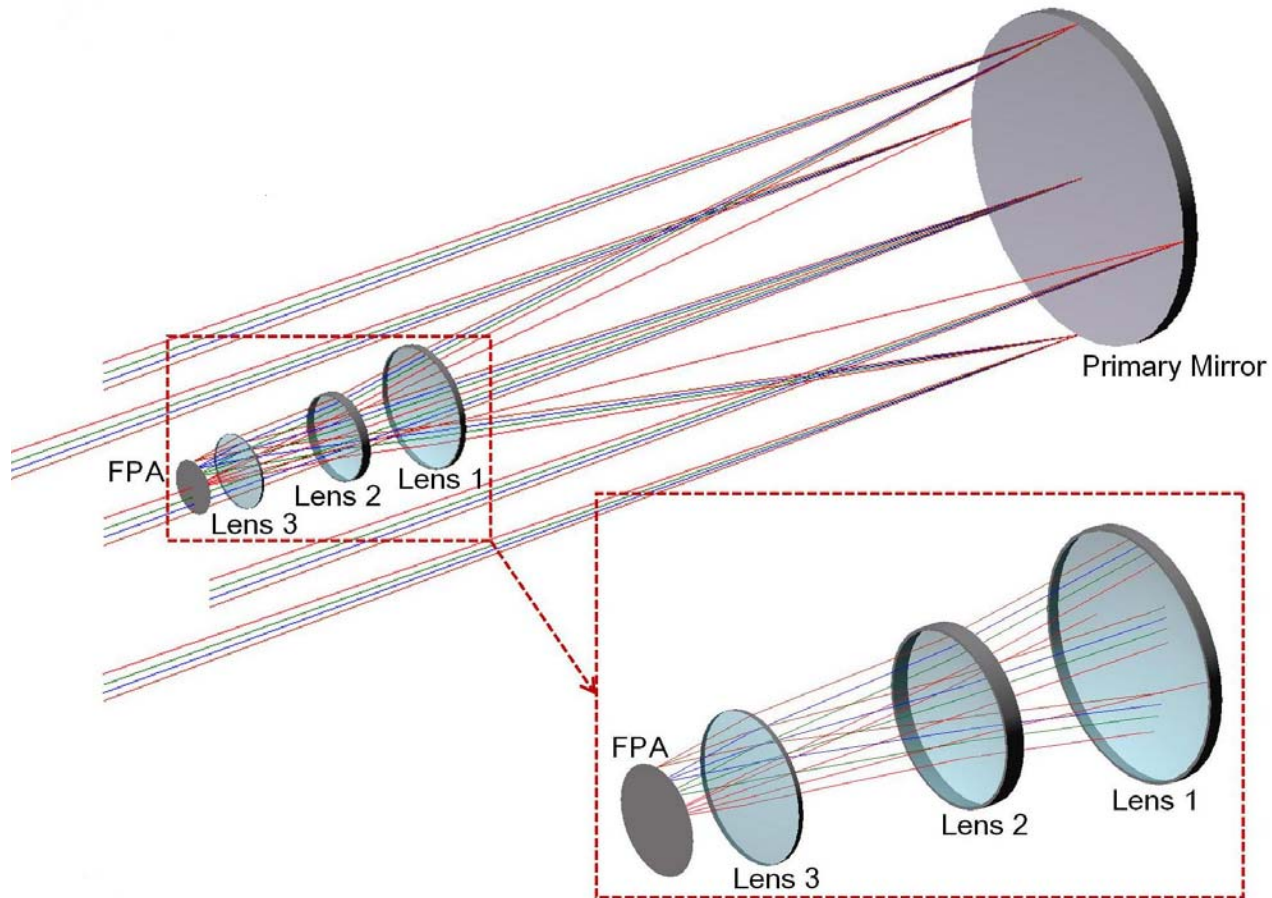
- 1) Wide field: to increase the cadence of observation by using wide-angle camera
- 2) Network of telescopes: for continuous coverage of microlensing events
- 3) Midsized aperture telescopes: to secure photometric precision good enough to detect Earth-mass planets

Instruments

□ Telescope

- Aperture: Within the budget, we are considering three 1.6m telescopes or two 2.0m telescopes. We prefer 1.6m diameter for complete coverage.
- Mount configuration: We prefer the equatorial type because it may not be easy to compensate the image rotation effect for the Alt-Az type
- Optical configuration: We prefer the prime focus. However, we do not rule out the Cassegrain-type.
- Field of View: We shall have 2.0x2.0 degree square FOV in combination with a wide-field telescope and CCD camera.

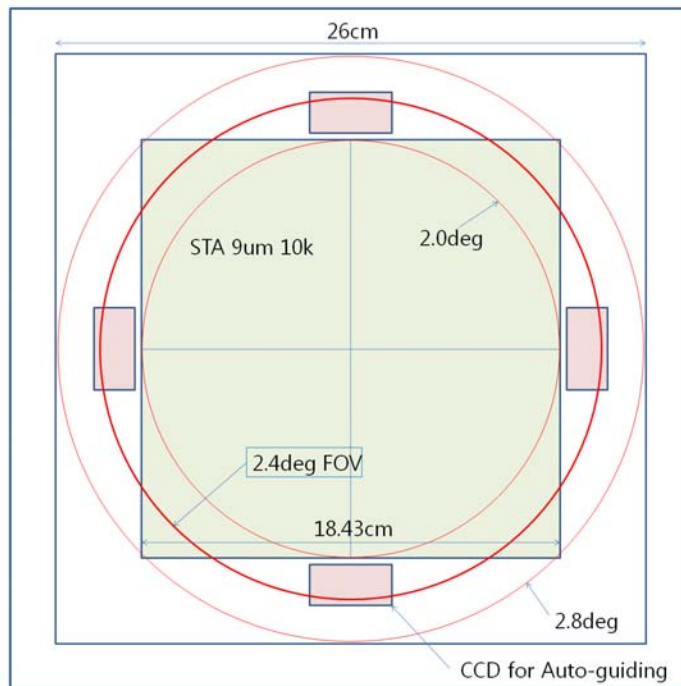
□ Optical design



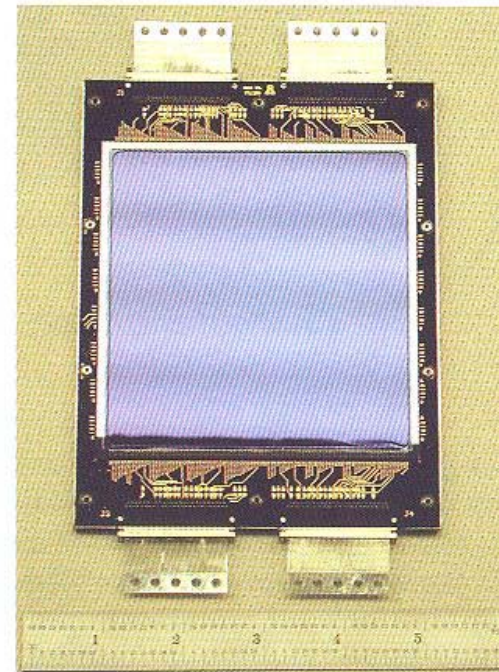
One of the optical design with 1.6m, $f/3.25$, prime focus and 4 deg^2 field of view

□ Camera

- We would like to use a 20k x 20k CCD camera so that the pixel scale should be 0.36 arcsec per pixel.



Schematic view of the camera with 4 MOSAIC CCD chips with 10Kx10K pixels.



The world's largest image sensor, developed by Semiconductor Technology Associates, Inc. This is 10Kx10K (111 Megapixel) CCD.

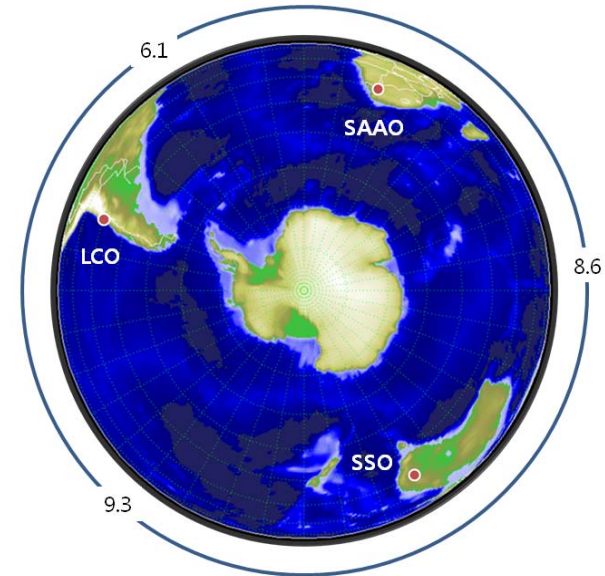
Sites

□ Three sites

- 1) South Africa (SAAO)
- 2) Australia (Siding Spring Observatory)
- 3) Chile (Las Campanas Observatory)

□ Continuous observation

- The telescopes will be separated ~ 8 hrs.
- We prefer already well-developed sites.
- We are in contact with related institutions.
- An issue: The LCO site overlaps with the OGLE telescope.



Plan

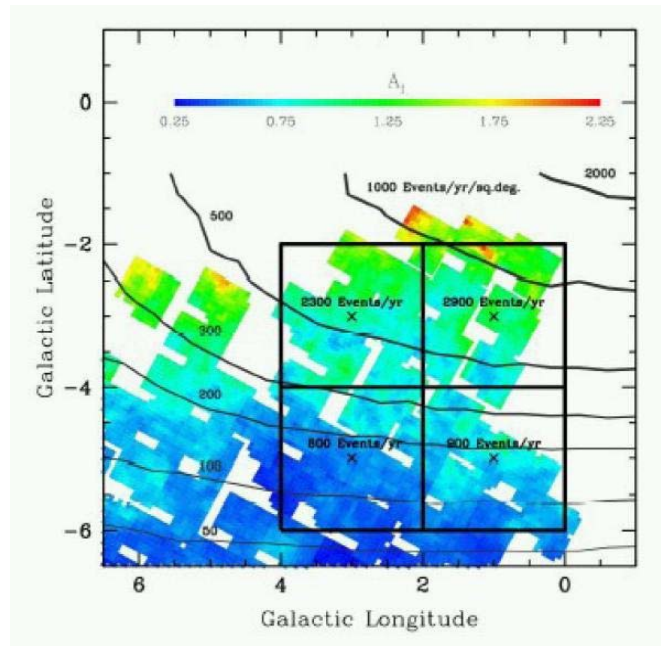
Unit: US Million Dollars

year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
budget	0.75	1.5	4.5	5.3	4.5	1.7	0.9	0.9	0.9	0.9
plan	1st telescope completion									
		2nd telescope completion								
		3rd telescope completion				experiment				
	data pipeline development									
	light curve analysis code development									

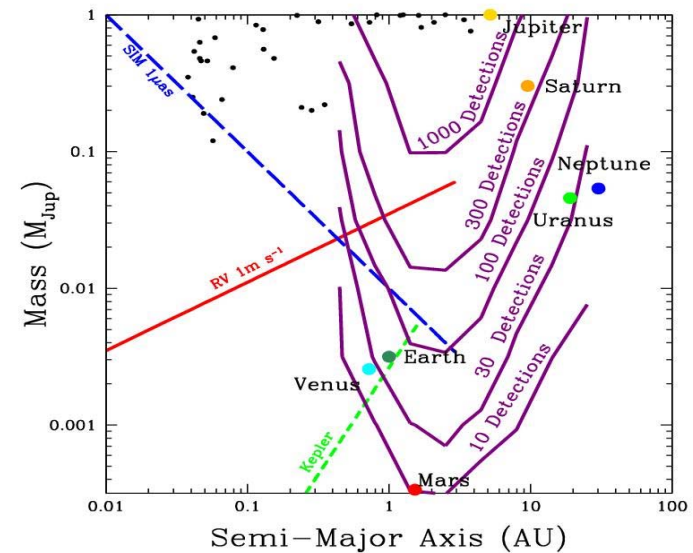
- ※ The total amount is subject to exchange rate (USD1=KRW1,000 in the 1st half 2008, USD1=KRW1,400).
- ※ 20-30% of the budget goes to the salary of researchers (overhead).

Future

- **Scientific outcome** (based on simulation by Gaudi, Gould & Han 2005)
 - Earth $O(10) \times (f/100\%)$
 - Neptune $O(30) \times (f/30\%)$,
 - Jupiter $O(100) \times (f/10\%)$,
- f : the fraction of stars with each type of planet



Observation field



Planets expected from KMTNet project

International collaboration

- Coordination with existing survey experiments
- International collaboration: We welcome anybody with possible contribution in any parts, e.g.
 - 1) Planetary lensing modelling,
 - 2) Data process pipeline,
 - 3) 2nd sciences,
 - 4) etc