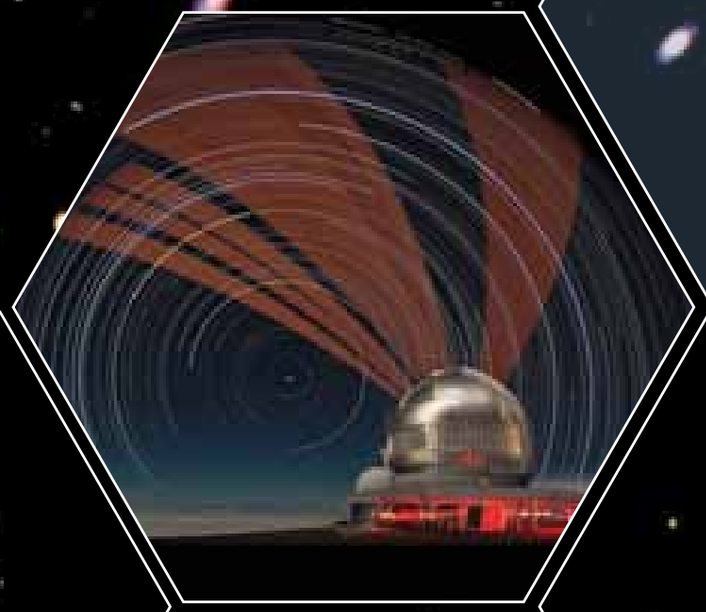
CANADIAN PARTICIPATION IN WFIRST

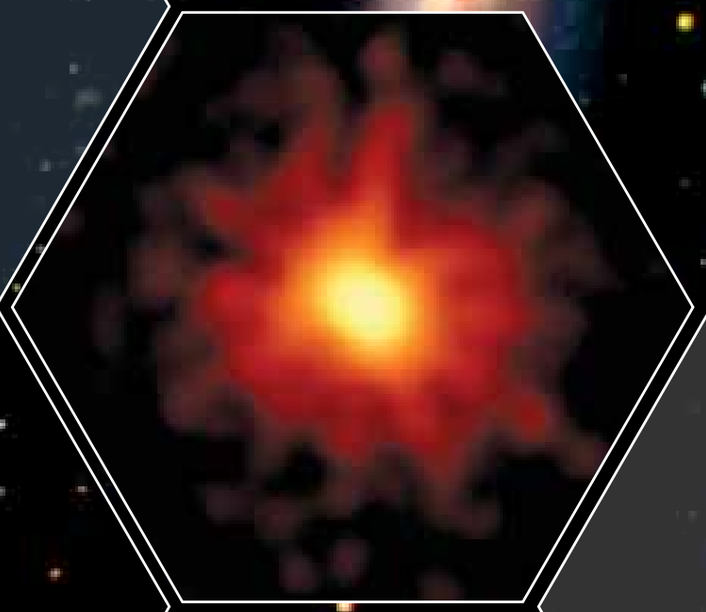
Mike Hudson
U Waterloo - Canadian rep on WFIRST SDT

Unveiling the Cosmos

A Vision for Canadian Astronomy

Report of the Long Range Plan 2010 Panel





CANADIAN LONG RANGE PLAN (2010)

Recommendation:

" … Canadian astronomers participate in a major wide-field ***Dark Energy*** *satellite mission. Joining Euclid or WFIRST as a* ***significant partner*** *would fulfill this recommendation, provided that we can (i) negotiate a partnership in the leading mission, and (ii) identify a* ***contribution to*** *the satellite* ***instrumentation.****"*

"… Euclid/WFIRST has emerged as the LRP2010 panel's ***top space priority.****"*

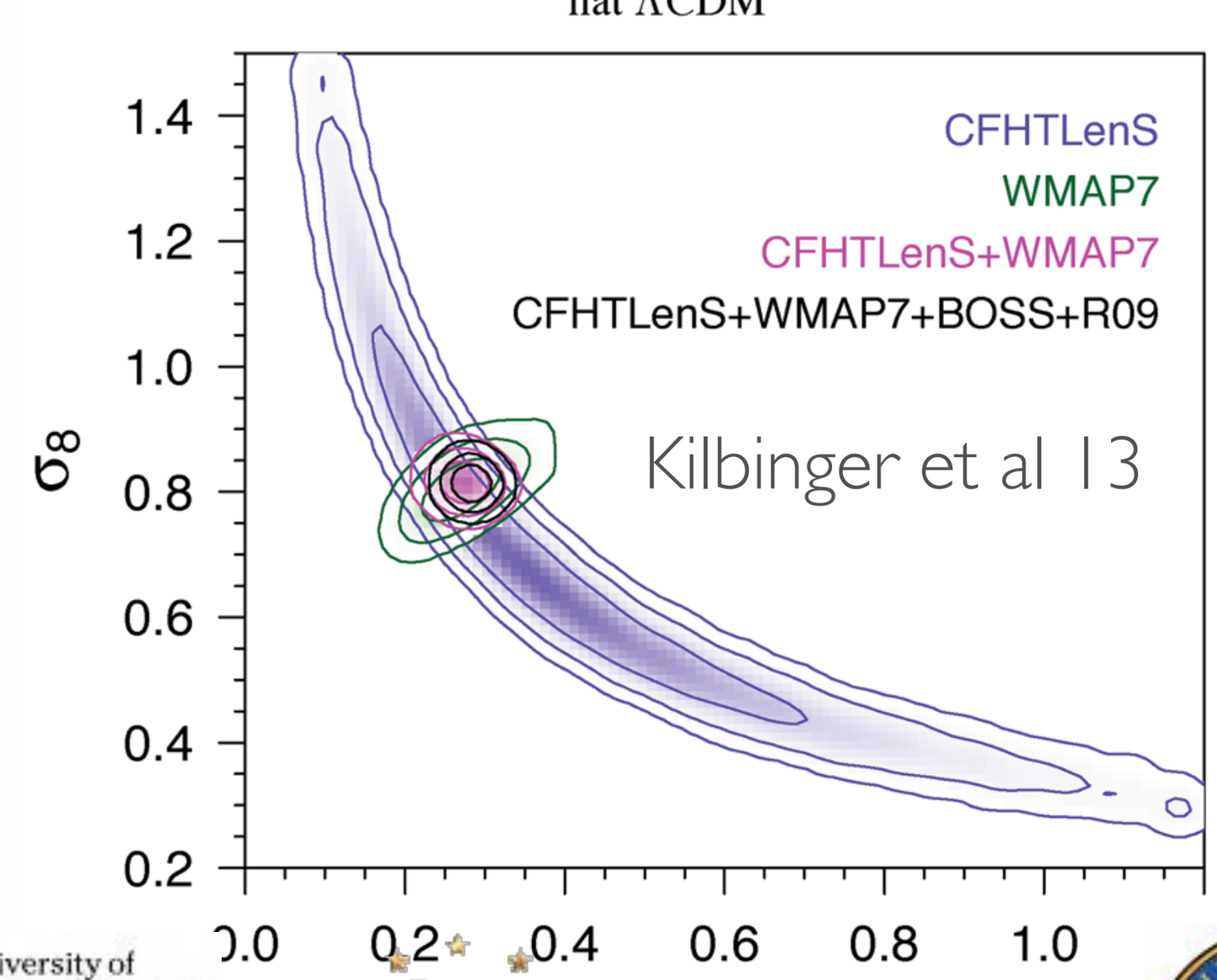
WIDE-FIELD IMAGING IN CANADA

- CFHT Megacam surveys are current state-of-the-art

- Deep: SNe (SNLS: e.g. Sullivan *et al.* 11, Conley et al. 11)

- Wide: Lensing

CFHTLenS Team



UBC

universitätbonn
Rheinische Friedrich-Wilhelms-Universität Bonn

MegaPrime CFH MegaCam Legacy Survey
CFHTLS

THE UNIVERSITY OF EDINBURGH

Universiteit Leiden

University of Waterloo

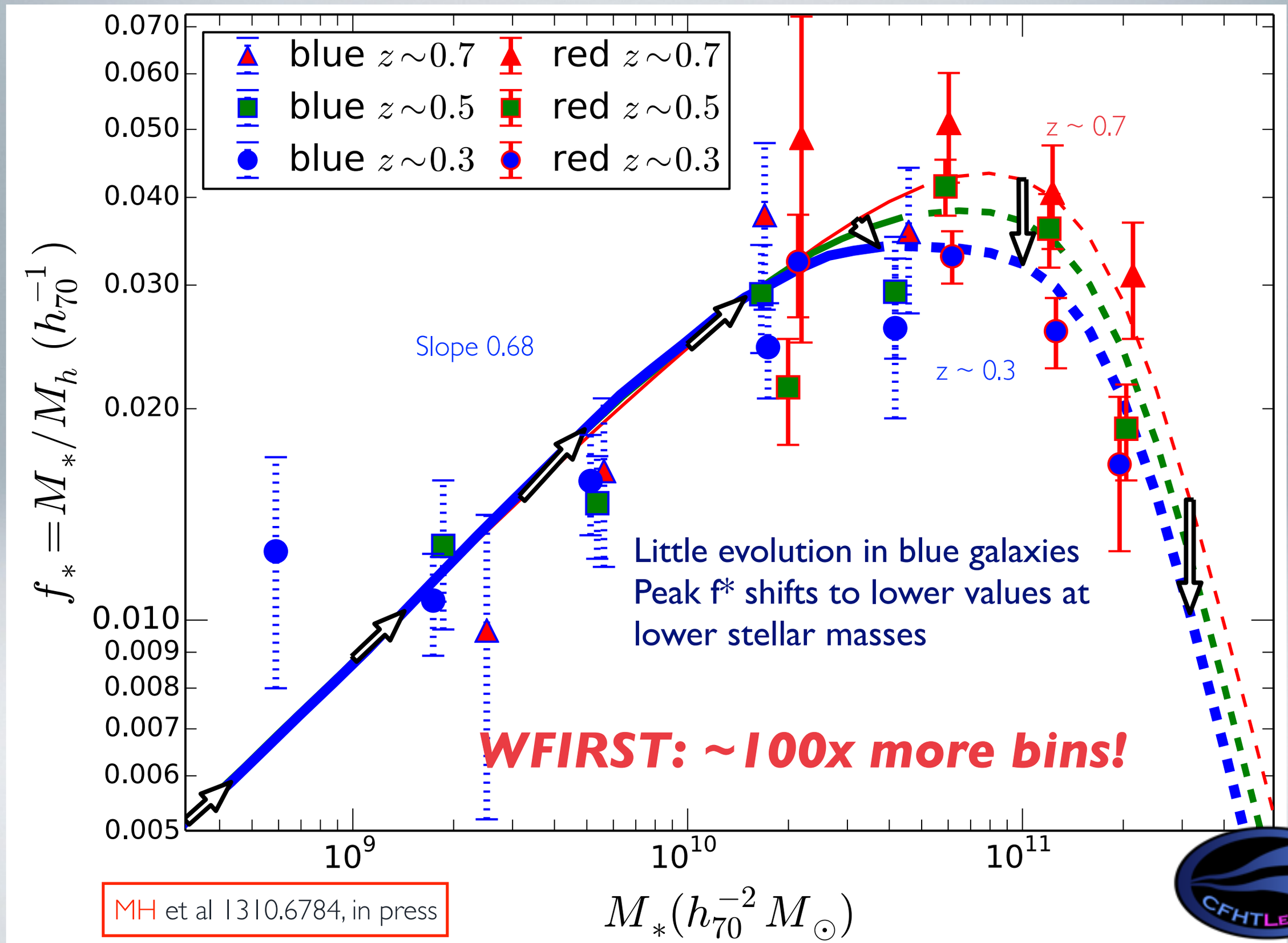
IAP

UCL

UNIVERSITY OF OXFORD
DOMINUS ILLV MINA TIO MEA

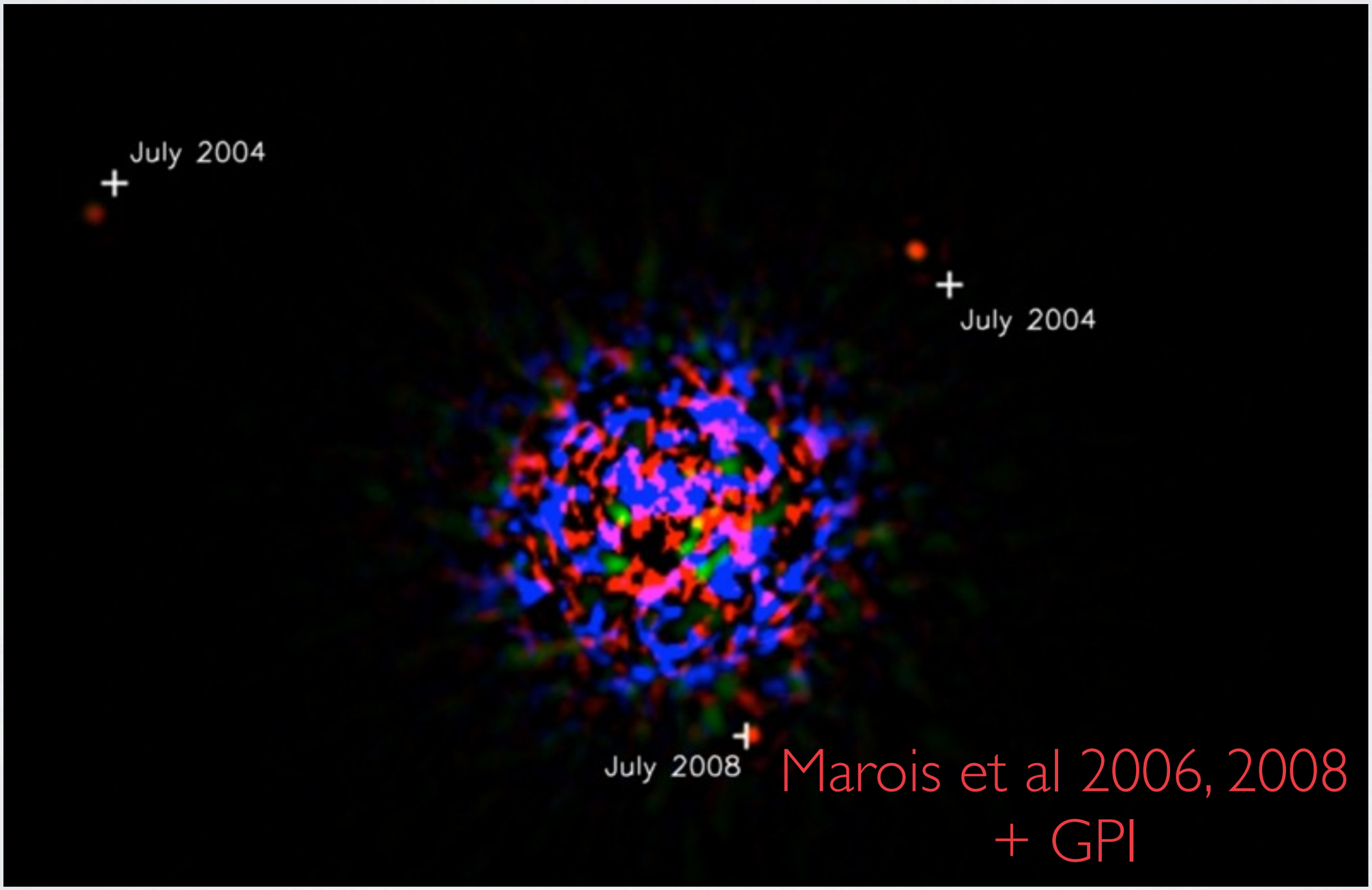
CFHTLenS

GALAXY-GALAXY LENSING: CO-EVOLUTION OF STELLAR AND DARK MATTER MASS



MH et al 1310.6784, in press

EXOPLANETS



Marois et al 2006, 2008
+ GPI

CANADIAN SPACE AGENCY AND ASTRONOMY

- Launched missions joint with NASA, ESA
    - FUSE
    - Herschel/HIFI (U. Waterloo)
    - Planck
- Current with JAXA
    - Astro-H

CANADIAN SPACE AGENCY AND ASTRONOMY

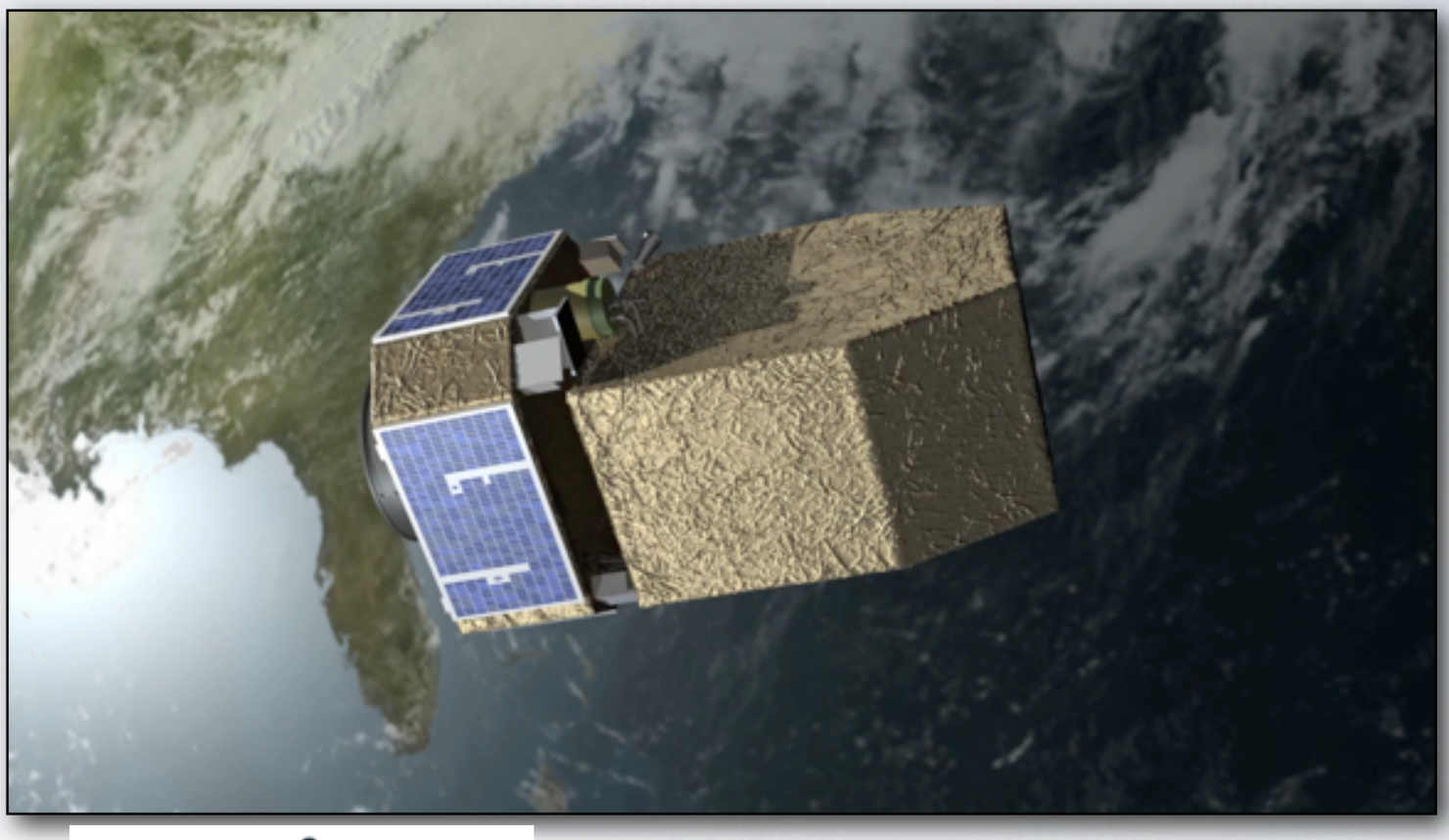
JWST

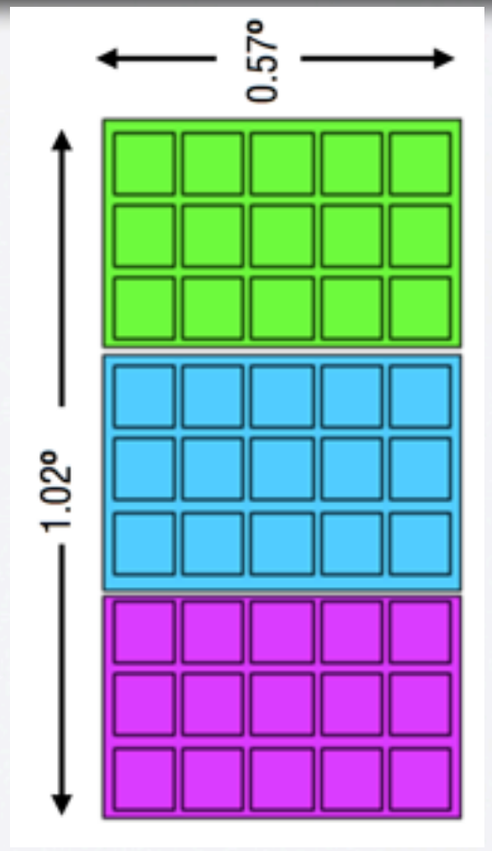
- ~$150 M from CSA
  - Fine Guidance Sensor
  - Near-Infrared Imager and Slitless Spectrograph (NIRISS)

- PIs: Hutchings (NRC) and Doyon (U Montreal)
- Both built by COM DEV

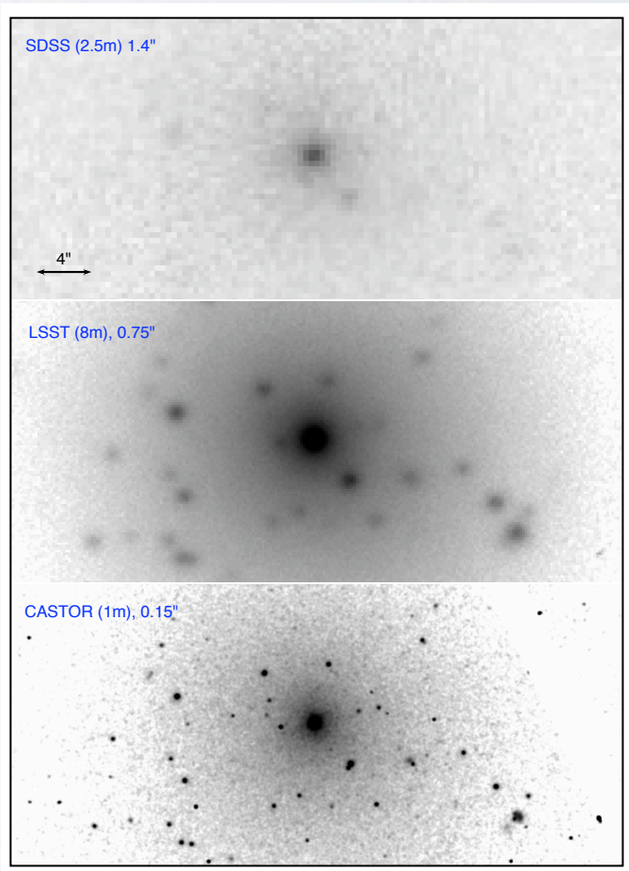
Proposed: CASTOR Design and Specifications

- **Telescope**
  - three mirror anastigmat
  - unobscured aperture = 1m
- **Focal Plane**
  - 45 4k × 4k H4RG with 10μm pitch
  - FWHM = 0.15″
  - field of view = 1.02° × 0.57°
  - three filter imaging
    - 400-550 nm (**g**)
    - 300-400 nm (**u**)
    - 150-300 nm (**UV**)
- **Orbit**
  - 600-1000 km
  - sun synchronous low Earth orbit
- **Mechanical Design**
  - customized MAC-200 SmallSAT bus
  - payload mass = 572 kg
  - spacecraft mass = 1320 kg
- **Operation Mode**
  - nominal 5-year lifetime
  - legacy surveys ⇒ GO programs



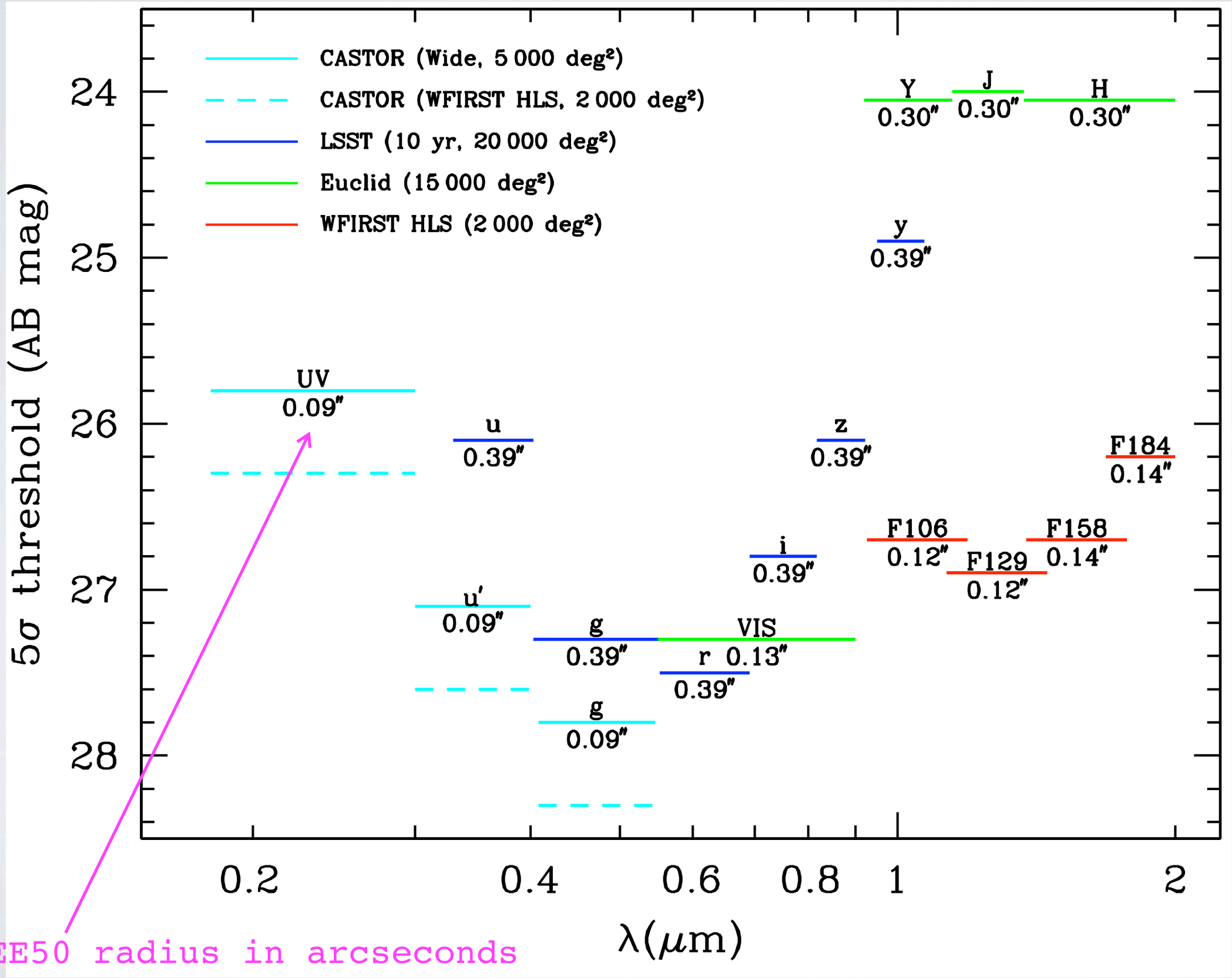


CASTOR focal plane



See P. Cote or poster 6

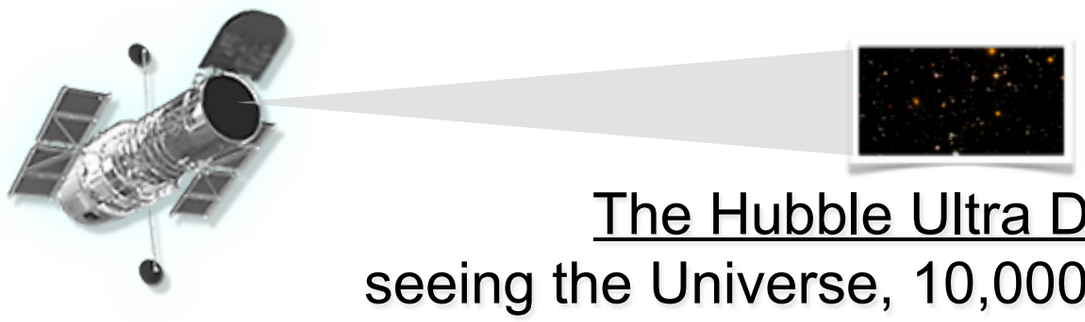
Sensitivity and Wavelength Coverage



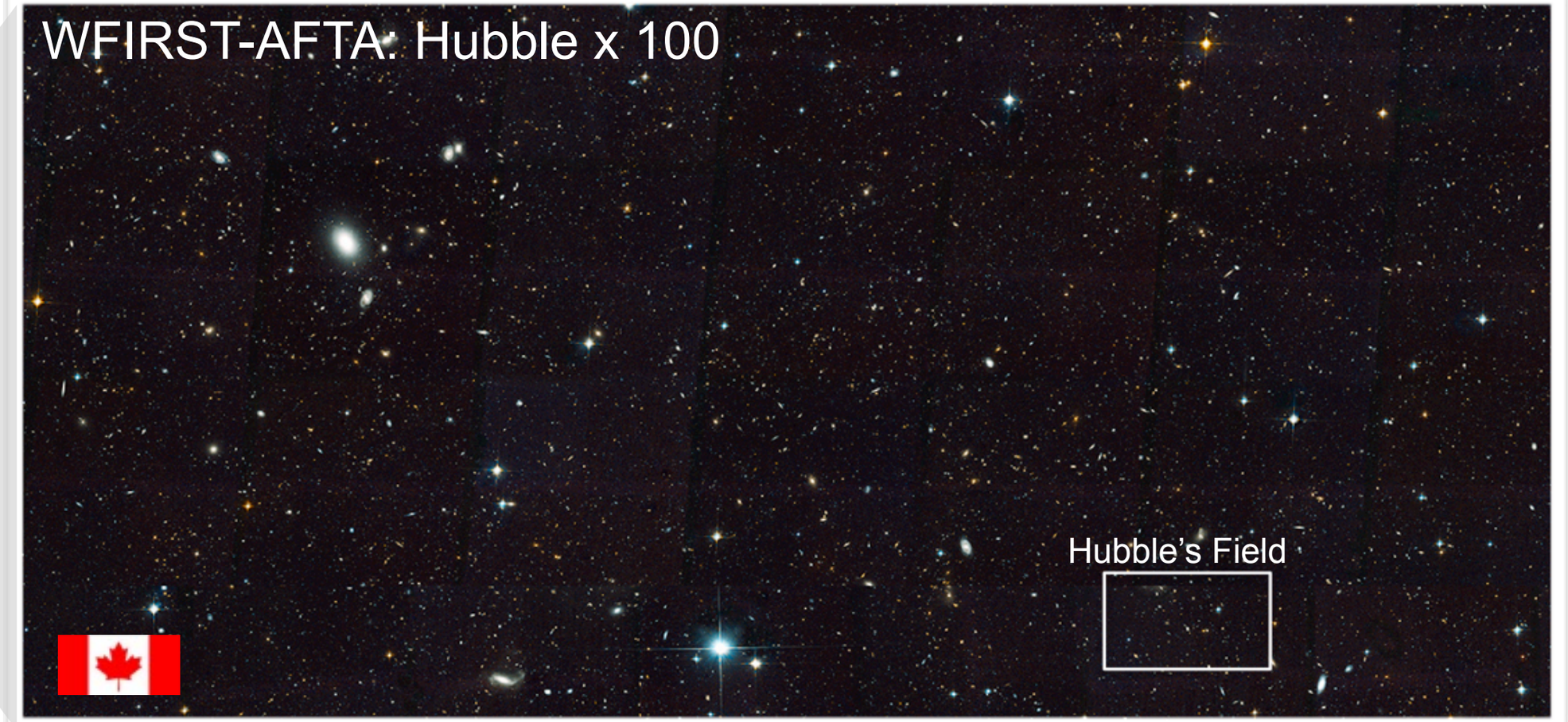
WFIRST STATUS IN CANADA

CSA has launched two studies to examine instrument options for:

- WFI
  - IFU/slicer
  - Calibration
  - Guidance
  - Data and software
- Coronograph
  - IFS
  - EMCCD
  - Analysis software



The Hubble Ultra Deep Field
seeing the Universe, 10,000 galaxies at a time



A WFIRST-AFTA Deep Field
A New Window on the Universe - **1,000,000** galaxies at a time

WFIRST IN CANADA

- CSA has launched two studies to examine instrument options:
  - Due date: approx 6 months
- Strong response from the Canadian astronomical community to participate in these studies
- Long Range Plan Mid-Term Review final report due Fall 2015