

# **Polarimetry of comets and asteroids**

M. Ishiguro★, D. Kuroda, Y. Kwon, et al.

第8回光赤外大学間連携ワークショップ (8<sup>th</sup> OISTER Workshop at NAOJ)

# Asteroids

# Introduction: Solar System Polarimetry (2)

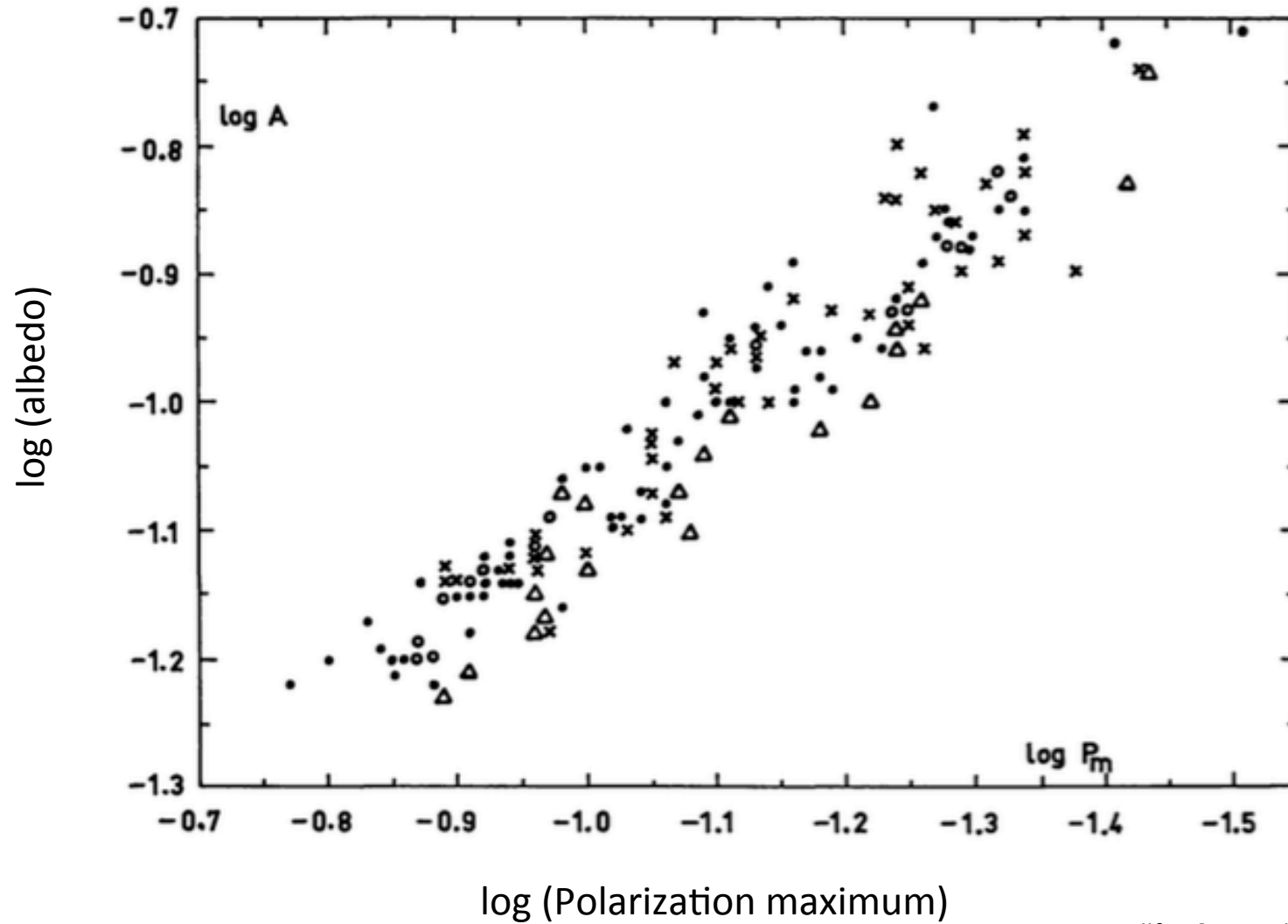


Nikolay Umov(1846-1915)

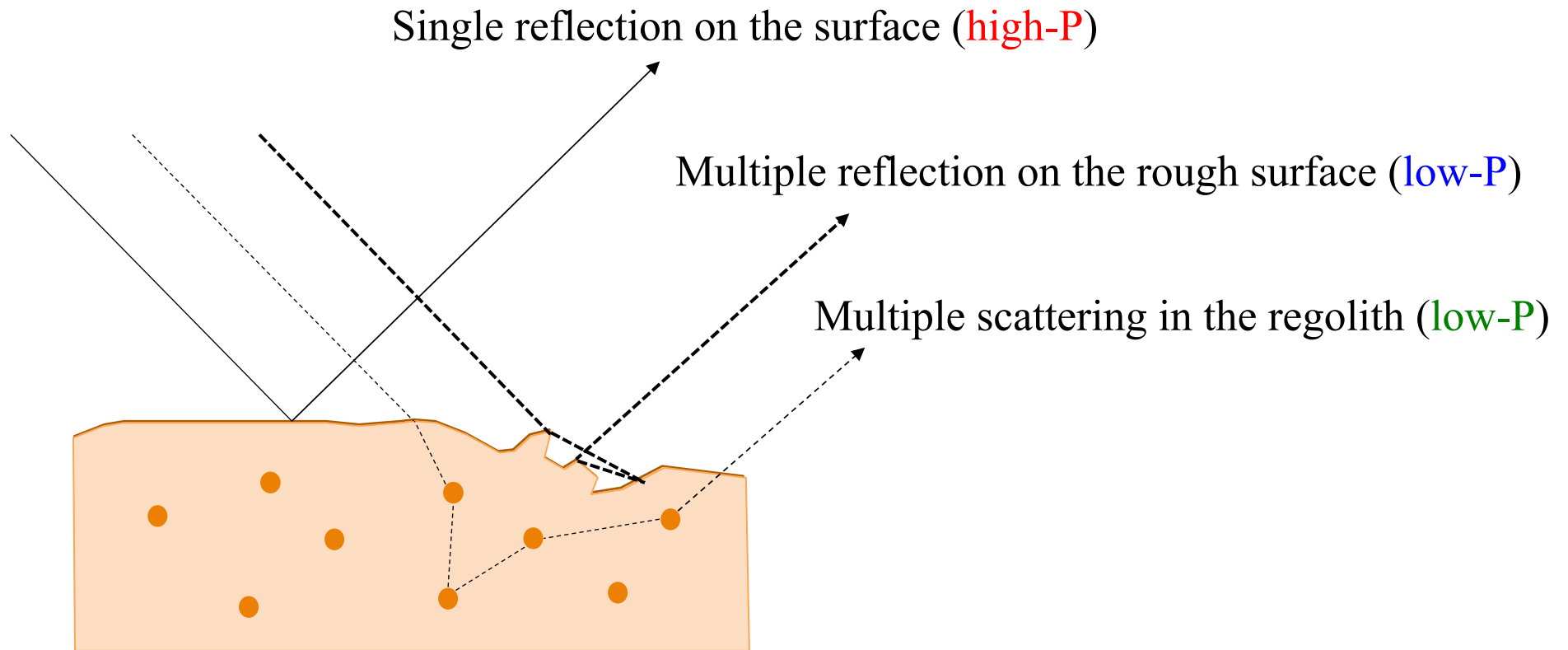
Umov effect (1905):

$$P_{\max} \propto (\text{albedo})^{-1}$$

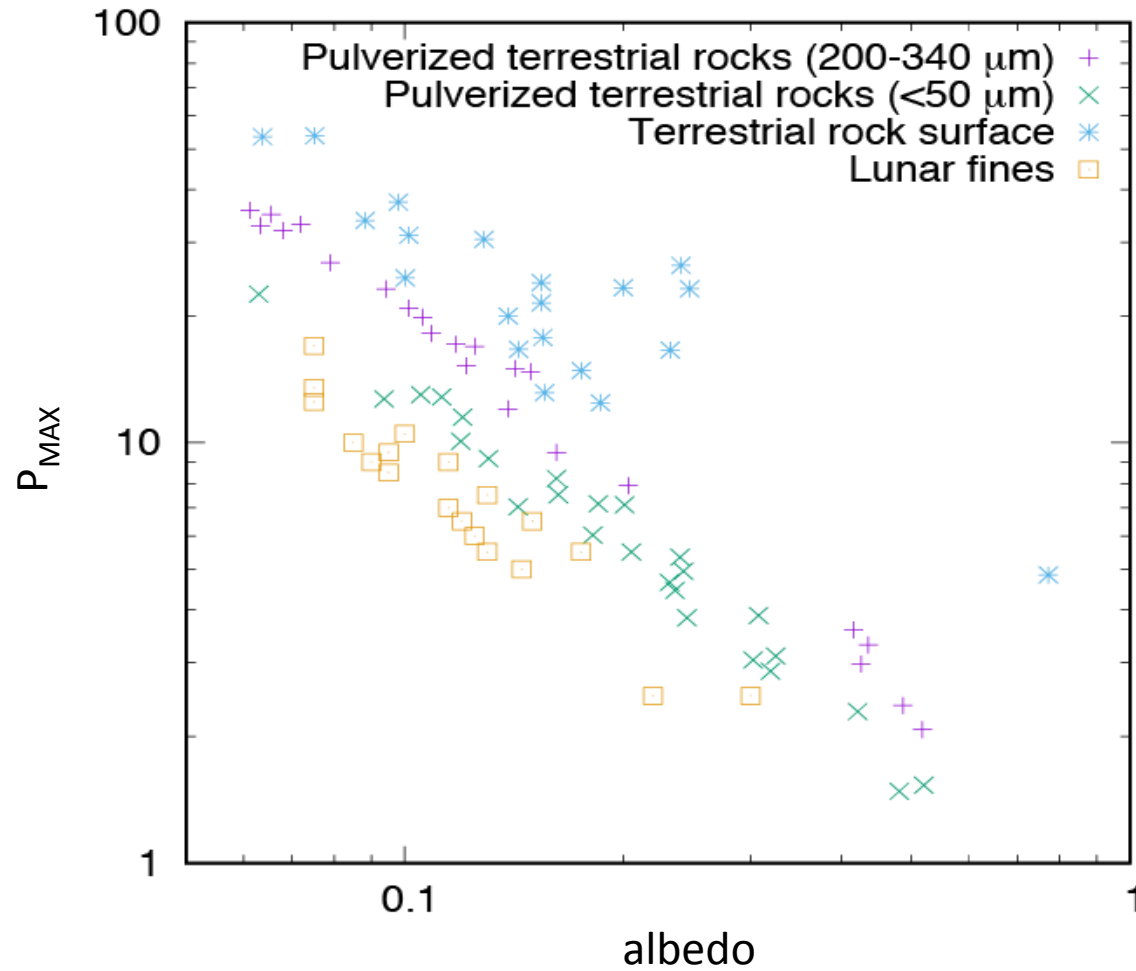
# Introduction: Solar System Polarimetry (2)



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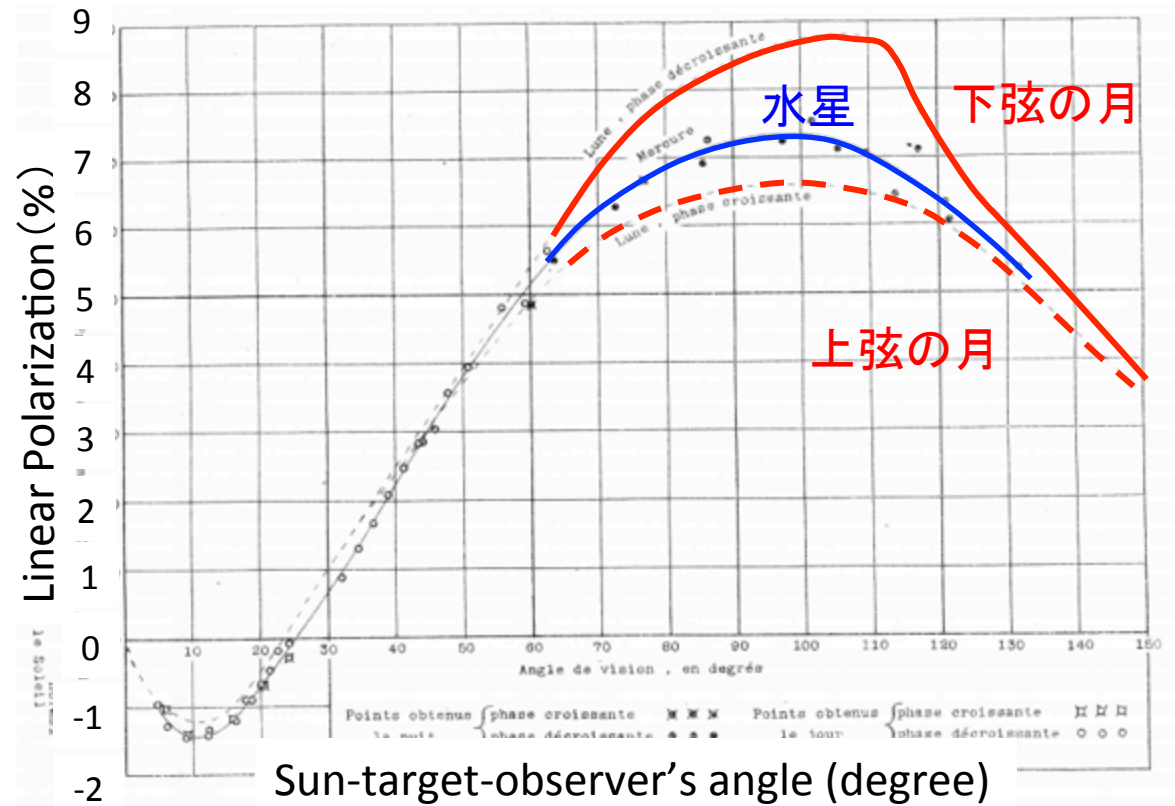
# Introduction: Solar System Polarimetry (2)



# Introduction: Solar System Polarimetry (3)



Bernard Ferdinand Lyot (1897-1952)



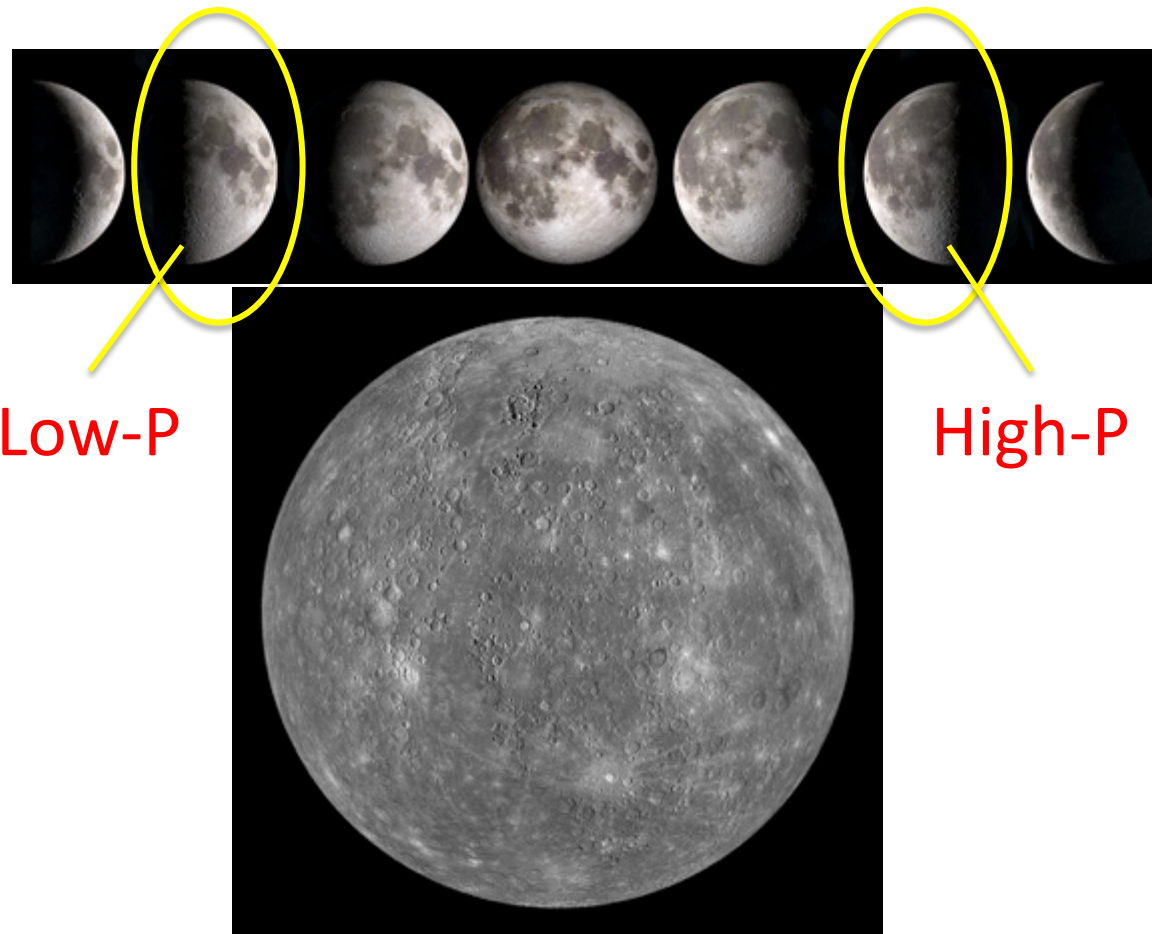
Lyot, B. Comptes Rendus Acad. Sci., 29 Oct., 1930.

***“La surface de Mercure semble donc plus homogène que celle de la Lune.”***

# Introduction: Solar System Polarimetry (3)



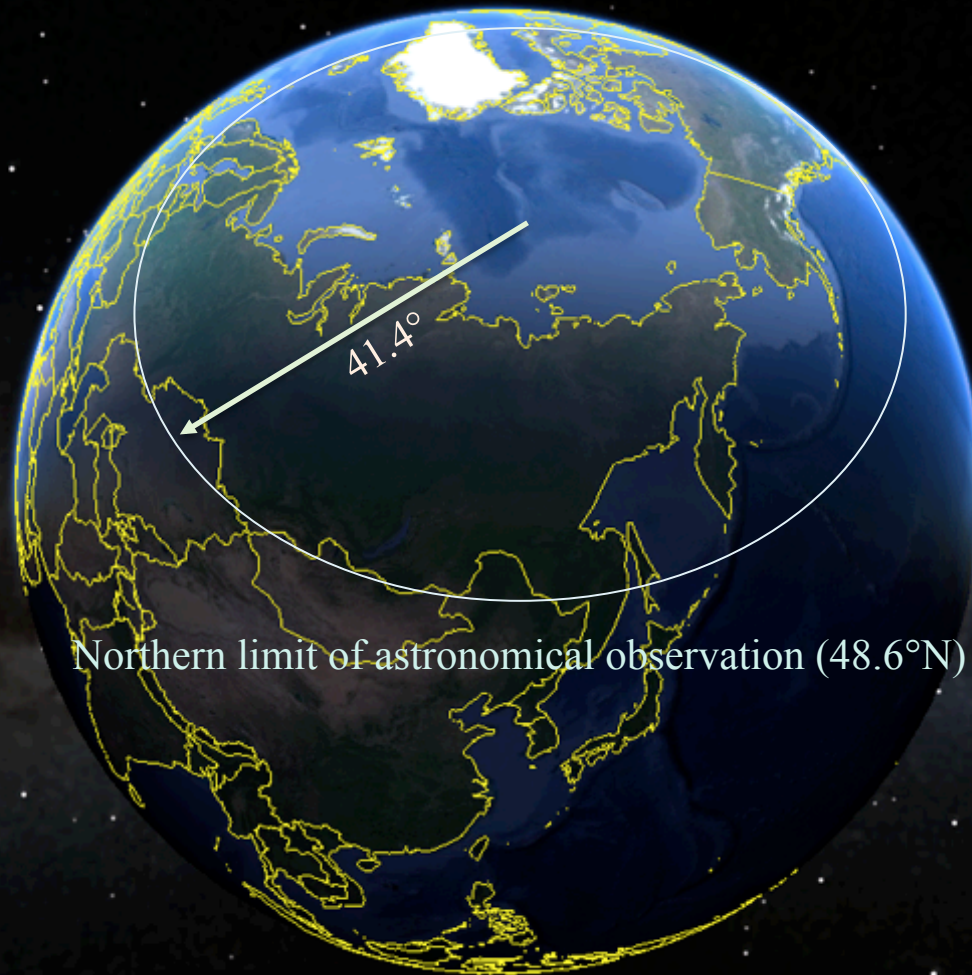
Bernard Ferdinand Lyot (1897-1952)



*“La surface de Mercure semble donc plus homogène que celle de la Lune.”*



# Northern limit of astronomical observation



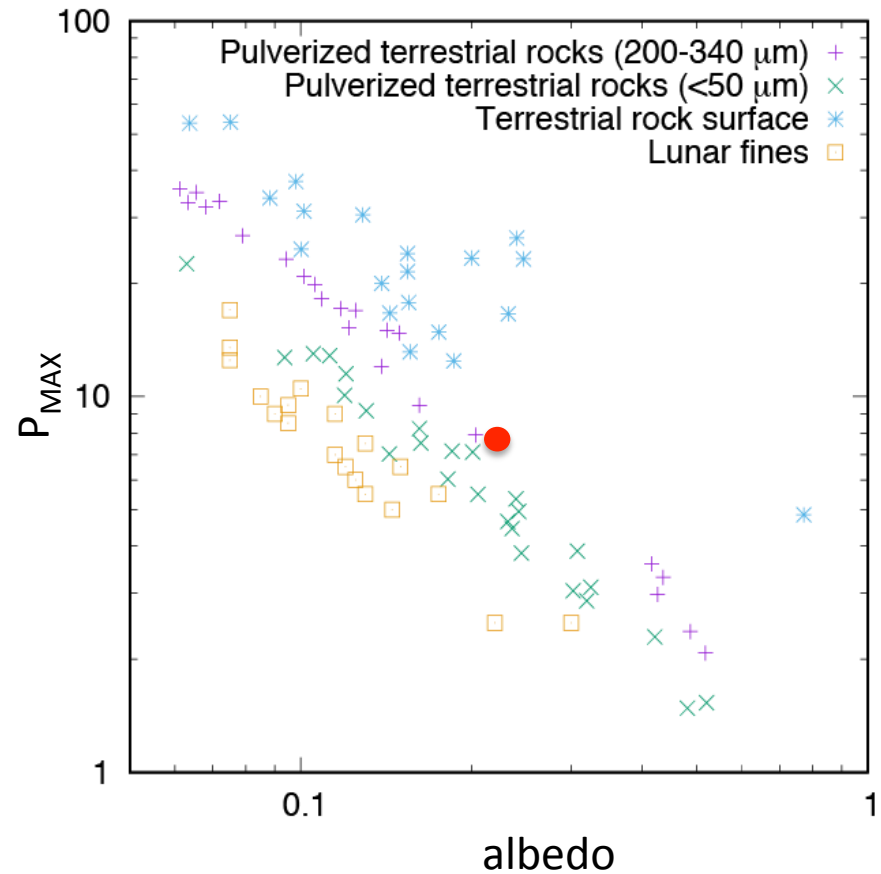
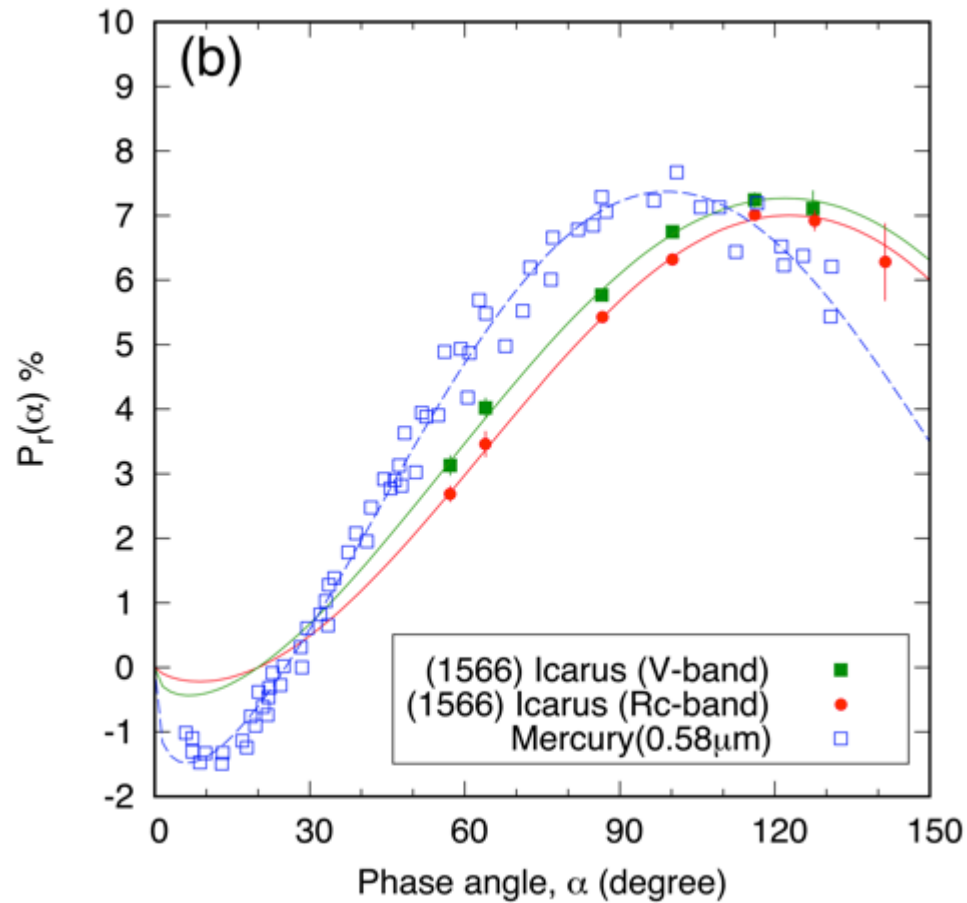
US Dept of State Geographer  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
© 2016 Google  
© 2009 GeoBasis-DE/BKG

Google Earth

Imagery Date: 12/14/2015 58°32'21.48" N 123°10'39.72" E eye alt 12924.38 km

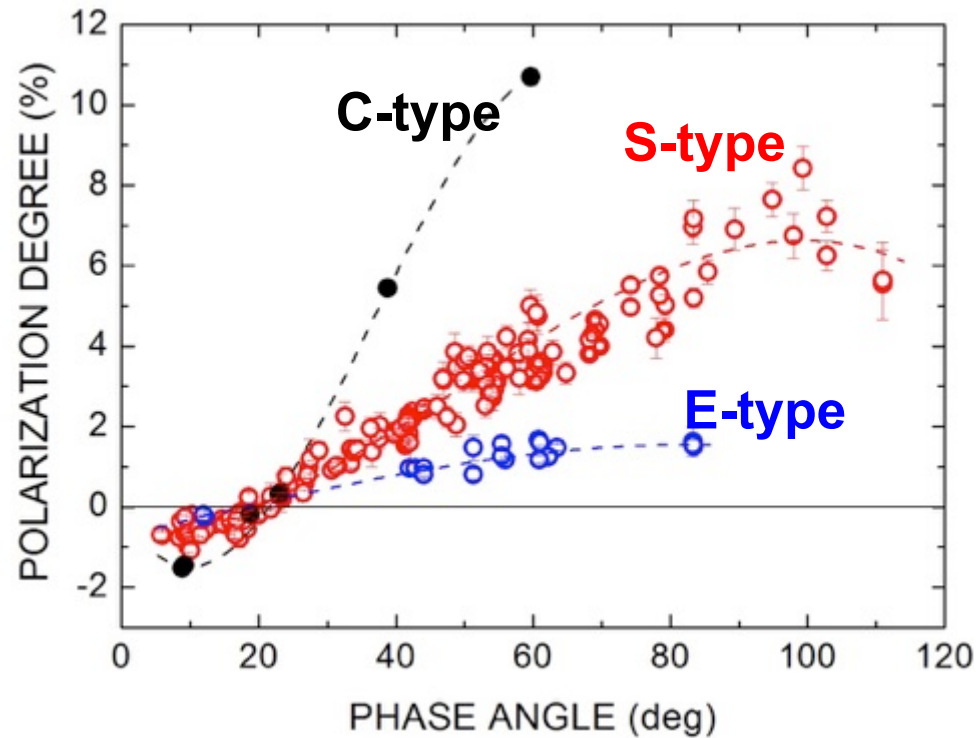
# Introduction: Solar System Polarimetry (4)

Asteroid 1566 Icarus

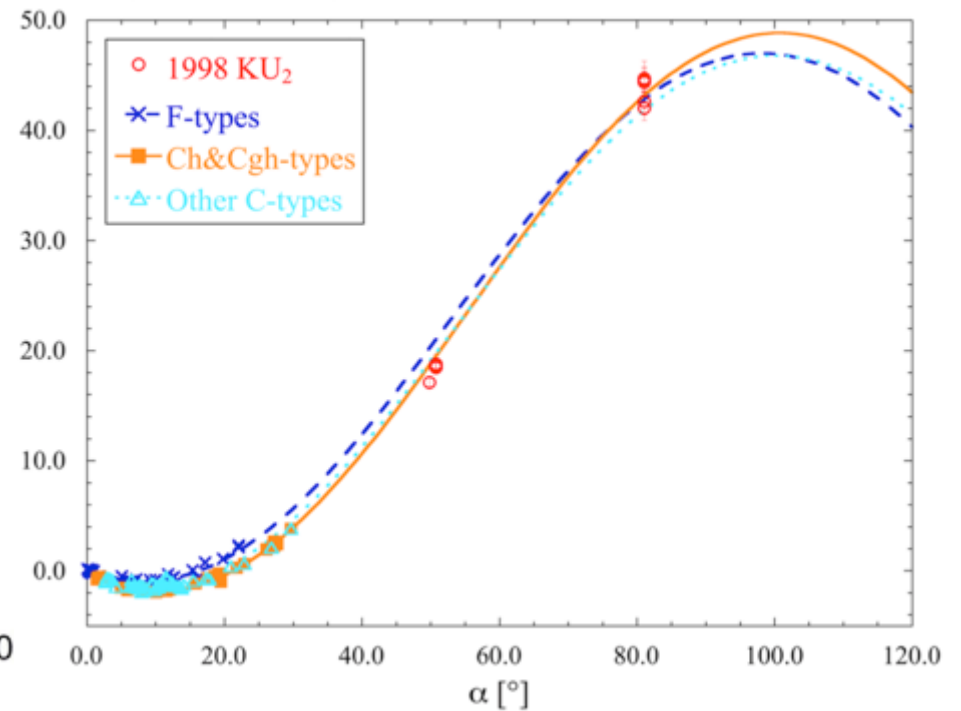


# Introduction: Solar System Polarimetry (4)

2017年以前の小惑星の偏光データ



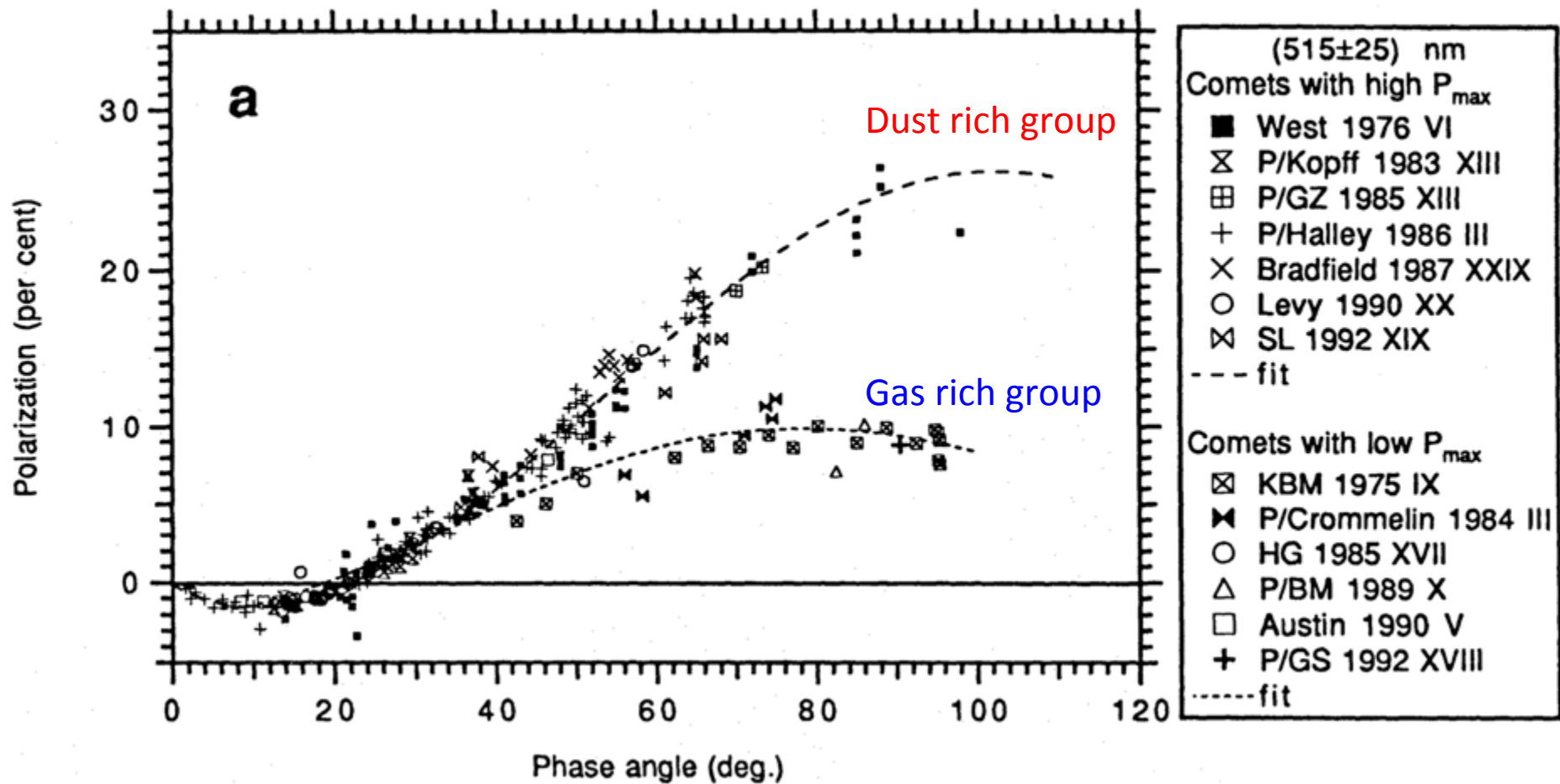
Asteroid 1998 KU2



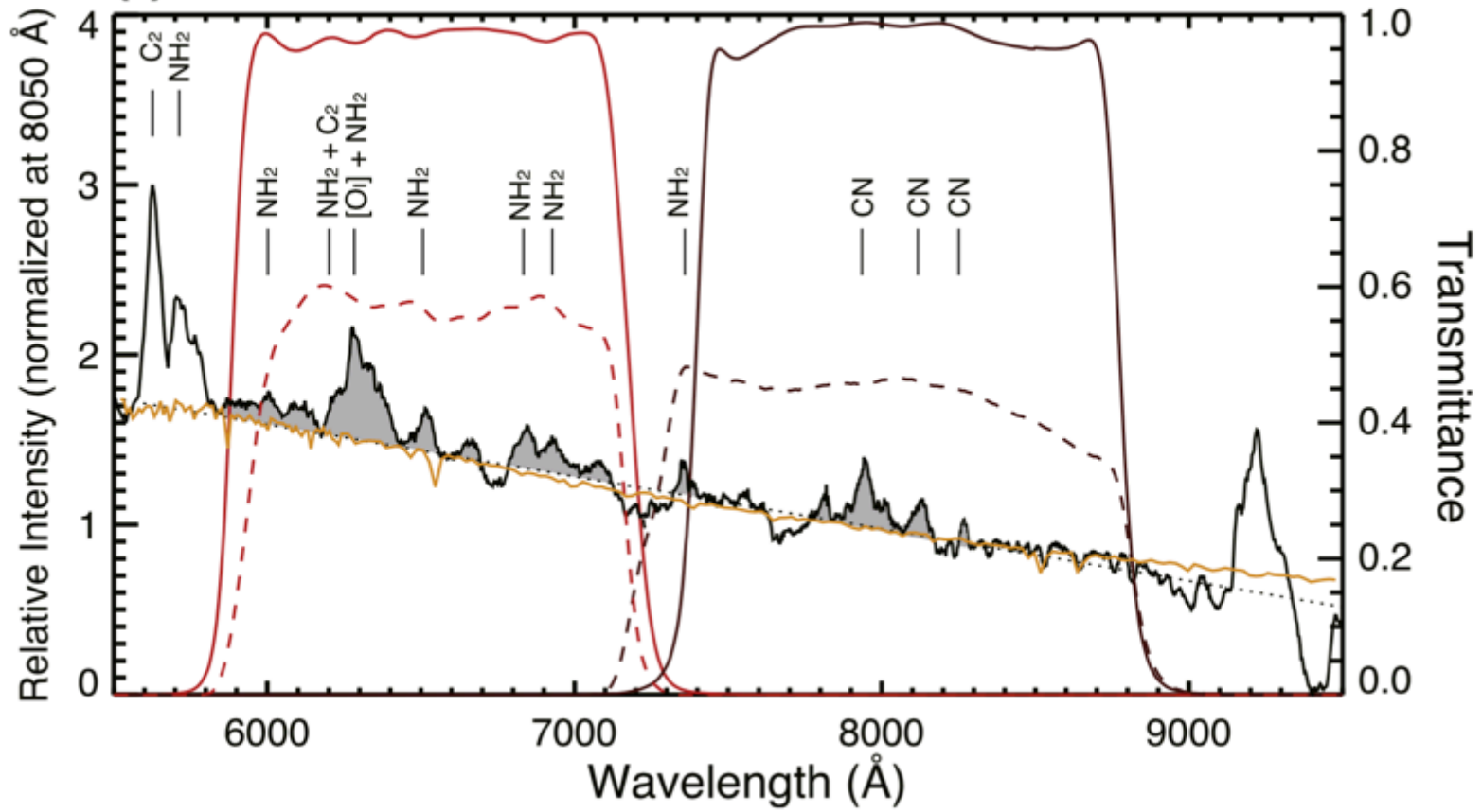
Kuroda et al. A&A (accepted)

# Dust from Comets

# Dichotomy of Polarization Groups ???

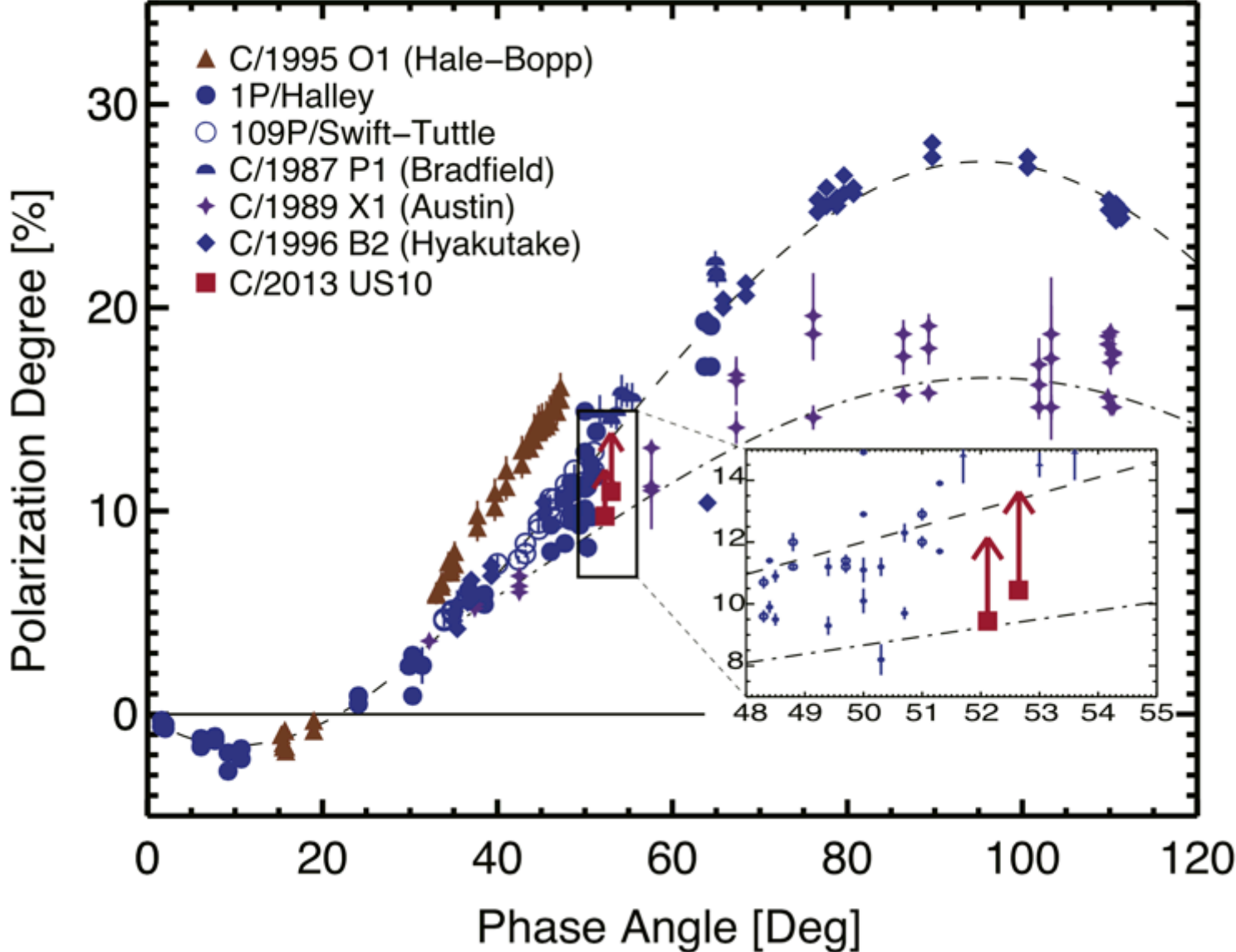


Levasseur-Regourd et al. A&A 313, 327 (1996)



Kwon et al. AJ 154, 173, 2017

R-filter domain



# 大学間連携プログラムの進捗報告

OISTER Program # 16B-01 (1)



Received: 2017. . . .

Proposal No. 16B-

## Application Form for OISTER (Cover Sheet)

Category  C/T C: Campaign T: ToO / (  N N: New C: Continuation ) Date: Y 2016 M 12 D 22

1. Title: **Polarimetry of Three Short-Periodic Comets**

2. Principal Investigator: Daisuke Kuroda ( ) Thesis: Thesis(Yes)

3. Institution: Okayama Astrophysical Observatory Present Position Research Expert

4. Address: 3037-5 Honjo, Kamogata-cho, Asakuchi, Okayama 719-0232 Country: Japan

Phone: 0865-44-2155 Fax: 0865-44-2360 E-mail: dai.kuroda@nao.ac.jp

5. Co-Principal Investigator: Yuna Kwon Institute / Position: Seoul National Univ / D1

Phone: +82-(0)2-880-6621 Fax: +82-(0)2-887-1435 E-mail: ynkwon@astro.snu.ac.kr

6. Collaborators (Family, First Name)	Institution	Country	Present Position
Masateru Ishiguro	Seoul National University	South Korea	Associate Professor
Hidekazu Hanayama	Ishigakijima Astronomical Observatory	Japan	Research Expert
Yuki Sarugaku	Kiso Observatory	Japan	Postdoctoral fellow
Hiroshi Akitaya	Hiroshima University	Japan	Assistant Professor
Masataka Imai	Hokkaido University	Japan	D2
Jun Takahashi	University of Hyogo	Japan	Researcher

### 7. Past Observations (within the Last Two Years):

Year(A/B)	P.I. Name	Object	Success Rate	Status/Publications
2014A	Ishiguro & Kuroda	209P/LINEAR	200%	Two papers published

# OISTER Program # 16B-01 (1)

## 1. Nayoro:

Feb. 13      45P imaging polarimetry (Rc)  
Feb. 15      45P imaging polarimetry (Rc)  
Mar. 12      41P imaging polarimetry (Rc)  
Mar. 15      45P imaging polarimetry (Rc)

## 2. Higashi-Hiroshima:

Feb. 13-15,18 2P imaging polarimetry (Rc+Ks)  
Feb. 19-21    2P **spectropolarimetry**

## Ishigakijima:

Feb. 11,15,16,19 2P  $g'R_C I_C$  imaging  
Feb. 15-16      41P  $g'R_C I_C$  imaging  
Feb 15          45P  $g'R_C I_C$  imaging

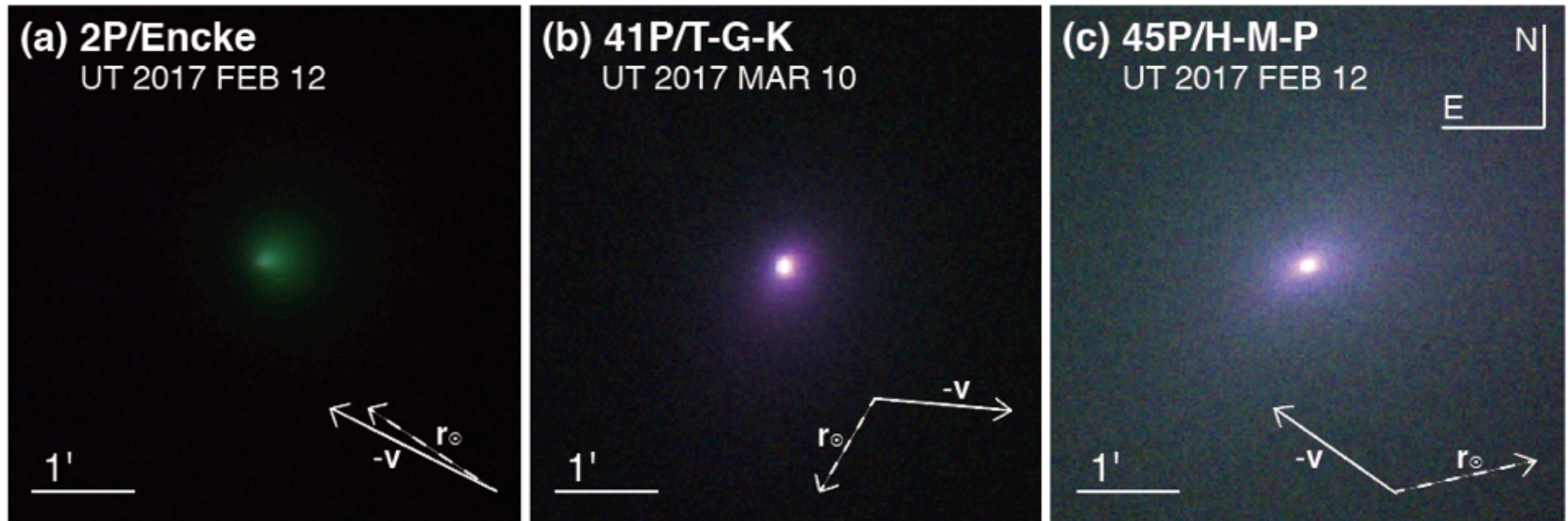
## Okayama 50cm:

Feb. 12-15, 18-21 2P  $g'R_C I_C$  imaging  
Feb. 12,14-15    45P  $g'R_C I_C$  imaging  
Mar. 10-May 29   41P  $g'R_C I_C$  imaging

## Nishi-Harima:

Feb. 13-15      45P spectroscopy  
Feb. 15,19      2P spectroscopy

# OISTER Program # 16B-01 (1)



Green: g<sup>r</sup>-filter / Blue: Rc-filter / Red: Ic-filter

(gas component of 45P fills the entire FOV)



未投稿データのため、ぼかして表示しています。

都合上削除しました。

都合上削除しました。

# 最後に、論文執筆予定

- 現在、2P/Encke彗星の偏光分光に関する論文を執筆中。今年度中に論文化を目指している。
- 他の彗星を含め、フルペーパーでもう一本、2018年度中の論文化を検討。