

海外の観測網への「適度な」参画の 可能性: GRANDMAとか

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これまでの議論

- 2018年頃？ 関口和寛さんにGROWTH（Caltech/ZTF中心のネットワーク）より打診あり
- 東工大（現東京科学大）グループはGROWTHに参加
- 協議会（+観測企画運営委？）で少し議論したもの、観測デューティーが厳しめなので、OISTERには荷が重いだらうという意見があった

NAOJ 国際外部評価(2021年度)

8. OISTER: Future prospects and funding

R8.2 Strategy: The EEC recommends developing a strategy for OISTER that is closely linked to the Japanese strategic plans in related areas of astrophysics and particle physics and include input from theorists. It should also be informed by the plans of international groups involved in transient follow-up. This would articulate observing priorities (beyond GW and neutrino sources). It should also describe the resources that are required to make/keep OISTER internationally competitive over the next 10 years; which could include upgrading detectors, automating telescopes, data archive facilities, upgrading software, including AI software to make observing decisions, computers, personnel, etc. It should also consider how OISTER will interact with, possibly collaborate with, other similar networks around the world.

国際的な突発天体の追跡観測へ参画することを推奨

(J-GEMやニュートリノとの連携観測も含め)こういった活動がOISTERを今後10年間にわたって国際的な競争力を保つために要求される

大学間連携への予算措置を続けてもらうにはこういった提案に応えることも必要

OISTERに相応しい観測ネットワークは？

- GRANDMA
- AMON
- ：

ほか、よい候補はありますか？

GRANDMA

From: Ali Takey <ali_takey@yahoo.com>↓
 To: Koji Kawabata <kawabtkj@hiroshima-u.ac.jp>, Ali Takey <ali_takey@nriag.sci.eg>↓
 Subject: Re: joining GRANDMA↓

↓
 It seems that our nriag mail server has a problem to deliver mails to you. Could you please confirm the receipt or not of this mail using my email: ali_takey@nriag.sci.eg.↓

↓
 ↓
 On Tuesday, November 19, 2024 at 02:26:23 PM GMT+2, Ali Takey <ali_takey@nriag.sci.eg> wrote:↓

↓
 Dear Kawabata-san,↓

I would like to draw your attention to the GRANDMA telescope network ([a:[https://grandma.ijclab.in2p3.fr/](https://jpn01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgrandma.ijclab.in2p3.fr%2F&data=05%7C02%7Ckawabtkj%40hiroshima-u.ac.jp%7C75a42d2e0db9475df0cf08dd08963924%7C%40454ddb2634926868d8e12640d3750%7C1%7C0%7C638676163477215620%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydwUuIiYiOiIwLjAuMDAwMCIsIiAiOiJXaW4zMlIsIkFOIjoIWFpbCIslldUIjoyfQ%3D%3D%7C0%7C%7C&sdata=N8aSX%2FZ0m37YcNwAGV8dSXWGVHeuKaI535pkjRKz8%2BY%3D&reserved=0)]) to do Time-Domain Astronomy. The PI of the project (Sarah Antier - sarah.antier@oca.eu) is seeking for more telescopes to join the GRANDMA. If you are interested in joining this group you may directly contact her to collaborate with GRANDMA using Kanata telescope or I can introduce you to her, as you like.↓

↓
We have contributed in observing a few GRBs and SNe using Kottamia telescope, which led to publications of a few papers led by GRANDMA scientists.↓

↓
 I hope you are interested in this collaboration.↓

↓
 Kind regards,↓
 Ali Takey↓

GRANDMA (つづき)

Global Rapid Advanced Network Devoted to the Multi-messenger Addicts

<https://grandma.ijclab.in2p3.fr/research/grandma-project/> (フランスが中心?)

■ Follow-up of (GW) sources reported in GCN

To ensure a large number of observations, we focused on Swift GRBs whose localization errors were generally smaller than the GRANDMA telescopes' field of view. This allowed us to bypass the transient identification process and focus on the reaction time and efficiency of the network.

(位置誤差が視野より小さいものを追跡観測する)

■ Composed of telescopes (mostly robotics)

Telescopes	Location	Aperture	FOV	Filter	mlim (single/stacked)	Obs. Strategy
Photometry SBO-SRO						
FRAM/Auger	Auger Obs (Argentina)/td>	0.3	1.0	Clear, RI	16/17	Tiling, Galaxy Target., OT charac.
FRAM/CTA-N	La Palma (SP)/td>	0.25	0.5	Clear, RI	16/17	Tiling, Galaxy Target., OT charac.
TAROT/TCR	La Reunion	0.20	4	Clear, RI	16/17	Tiling, Galaxy Target., OT charac.
TAROT/TCA	Calerne Obs. (France)	0.25	1.9	Clear, RI	17/18	Tiling, Galaxy Target., OT charac.
TAROT/TCH	Palma Obs. (Chile)	0.25	1.9	Clear, RI	17/18	Tiling, Galaxy Target., OT charac.
SVOM/GWAC-F30	Xinglong Obs.(China)	0.30	1	Clear, BRI	16.5/17	Galaxy Target., OT charac.
Abastumani-T48	Abastunami obs (Georgia)	0.48	20'	Clear, U,B,V,R,I	15/17	Galaxy Target., OT charac.
OHP/IRiS	OHP (France)	0.5	24'	Clear, u',g',r',i',z'	18/19	Galaxy Target., OT charac.
VIRT	Etelman obs (USA)	0.5	-	Clear, u',g',r',i',z'	18/19	Galaxy Target., OT charac.

GRANDMA(つづき)

Telescopes	Location	Aperture	FOV	Filter	mlim (single/stacked)	Obs. Strategy
OPD						
SHAO/T60	Shao (Azerbaijan)	0.6	28'	Clear, U,B,V,R,I	18/19	OT charac (any)
Makes-60	Les Makes (La Reunion)	0.6	23'	Clear, gr	18/19	OT charac (any)
UBAI-NT	Maidanak (Uzbekistan)	0.6	18'	Clear, U,B,V,R,I	18/19.5	Galaxy Target., OT charac.
UBAI-ST	Maidanak (Uzbekistan)	0.6	18'	Clear, U,B,V,R,I	18/19.5	Galaxy Target., OT charac.
AZT-8	Lisnyky obs (Ukraine)	0.70	16'	Clear, U,B,V,R,I	18/19.5	Galaxy Target., OT charac.
Abastumani-T70	Abastunami obs (Georgia)	0.70	30'	Clear, U,B,V,R,I	18/19.5	Galaxy Target., OT charac.
TNT	Xinglong obs (China)	0.8	11.2'	Clear,BVRI	18/19	galaxy targ, OT caract
OAJ-T80	Javalambre obs (Spain)	0.80	2.0	griz	18/19	TOO,tiling, OT caract
SVOM/C-GFT	Changchun (China)	1.20	1.5	Clear	19/20	Galaxy Target., OT charac.
Zadko	Australia	1.00	23'	Clear, gri	20/22	Galaxy Target., OT charac.
OHP-T120	OHP (France)	1.20	13.21'	Clear,BVRI	20/21	OT charac. (any)
OSN-T120	Sierra Nevada obs (Spain)	1.50	13'	Clear,BVRI	20/21	TOO,galaxy targ, OT caract Xinglong-
2.16	Xinglong Obs. (China)	2.16	9'	-	22	OT charac. (any)
CAHA-2.2	Calar Alto Obs. (Spain)	2.2	12'	-	22	TOO,OT caract
GMG-2.4	Lijiang Obs (China)	2.40	10'	-	22	OT charac. (any)
CFHT-Megacam (any)	CFHT (Hawaii)	3.6	1.0	g,i,r,z	23	TOO (prop), galaxy target,OT charac.
CFHT-Wircam	CFHT (Hawaii)	3.6	21.5'	H,J	22	TOO (prop), OT charac. (any)
GMG-2.4	Lijiang Obs (China)	2.40	10'	-	24	OT charac. (any)
Spectroscopy						
ShAO/T2m	Shamakhy Obs (Azerbaijan)	2.0	-	-	17 in 1h	OT charac. (any)
Xinglong-2.16	Xinglong Obs. (China)	2.16	9'	BFOSC	18.5 in 1h	OT charac. (any)
CAHA-2.2	Calar Alto Obs. (Spain)	2.2	16'	CAFOS	19 in 1h	TOO,OT caract
GMG-2.4	Lijiang Obs. (China)	2.40	10'	YFOSC	19 in 1h	OT charac. (any)

Kottamia Observatory / NRIAG はメンバーにはなっていないようだが、GRANDMA チームメンバにデータを提供し、論文の共著になっている模様

タイトルにGRANDMAを冠した成果

- 1 2024GCN.38370....1H 2024/11   
 LIGO/Virgo S241127aj: GRANDMA/FRAM-CTA-N Observations
 Hussenot-Desenonges, T.; Akl, D.; Coughlin, M. [and 12 more](#)
- 2 2024GCN.38366....1H 2024/11   
 GRB 241127A: GRANDMA and Kilonova-Catcher optical afterglow detections
 Hussenot-Desenonges, T.; Akl, D.; Coughlin, M. [and 16 more](#)
- 3 2024RNAAS...8..273A 2024/10   
 GRANDMA Observations of SN 2023wrk, a Luminous Type Ia Supernova with
 Significant Unburned Carbon in the Outer Ejecta
 Andrade, Cristina; Duverne, Pierre-Alexandre; Liu, Jialian [and 90 more](#)
- 4 2024GCN.37989....1K 2024/10   
 GRB241030B: GRANDMA/TAROT Upper Limit
 Klotz, A.; Andrade, C.; Antier, S. [and 18 more](#)
- : :
- 108 2019GCN.24126....1B 2019   
 LIGO/Virgo S190412m: TAROT-GRANDMA observation report.
 Boer, M.; Christensen, N.; Eymar, L. [and 13 more](#)
- 109 2018ATel11796....1L 2018/06 cited: 2   
 SVOM/GWAC-F60 and GRANDMA optical follow-up of AT2018cow/ATLAS18qqn
 Li, H.; Zhang, P.; Xiao, Y. [and 27 more](#)
- 110 2018ATel11757....1K 2018/06 cited: 1   
 TAROT and GRANDMA follow-up of AT2018cow/ATLAS18qqn
 Klotz, A.; Antier, S.; Boer, M. [and 20 more](#)
- 111 2018ATel11743....1Z 2018/06 cited: 1   
 KAIT and GRANDMA further follow-up of AT2018cow/ATLAS18qqn
 Zheng, W.; Filippenko, A. V.; Antier, S. [and 14 more](#)

111編
 多くは速報系
 査読論文は6編
 (2020-24)

OISTERが参加する場合、
 GW関係での貢献は微妙
 (J-GEMがあるので)

AMON

■ The Astrophysical Multimessenger Observatory Network

<https://www.amon.psu.edu/>

PSUの高エネルギー宇宙グループを中心としたネットワーク
GCN/AMON Notices of IceCube events

2019年5月に千葉大で AMON collaboration meeting(?)
国内のIceCube opt/nirフォローアップチーム（諸隈さん、
太田さん、内海さん、内海さん、笹田さんほか）

GCN/AMON Noticesのフォローアップ観測をそれなりにすれば
正式参加が認められるらしい（MoU締結）

（日本チームの参加はペンディング）

正式に参加すれば、オープンでないアラートにアクセス可



どんなもんですかね？

引き続き考えていきましょう

LCOGT Las Cumbres Observatory

<https://lco.global/>

世界各地に1m鏡、2m鏡、0.4m鏡を配置
(新規設置＋既存鏡の再利用も)

- Purpose-build observe transient astronomical event
- A global distribution of telescope
オンラインのAIスケジューラー
5分おきに全ネットワークの観測計画を更新
- Dynamic observation scheduling
- Uniform Instrumentation across the network
- 完全なロボット観測
- Rapid delivery of data
露出終了後すぐに一時処理したデータをアーカイブ
データリダクションのソフトも充実(らしい)
原則1年後にはオープンに



