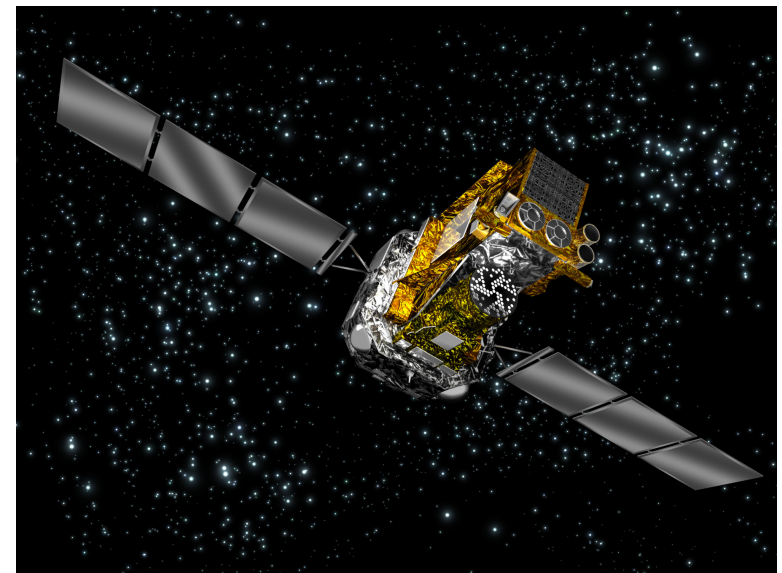




INTEGRAL

Project Scientist Report

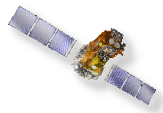
Erik Kuulkers
(ESA/ESTEC)



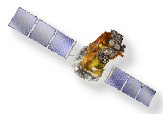
IUG Meeting #23 – ESTEC – 26 & 27 November 2019



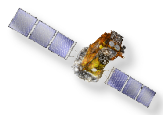
Community interfaces



Observatory status




Science highlights



Outreach

[INTEGRAL] Community interfaces



- Not attending (i.e., absence notified):
Angela Malizia, Miguel Mas Hesse, Rashid Sunyaev, Diego Torres
 - Ed van den Heuvel will join later today
 - IUG Invitees: Tim Finn (ESA/ESOC, INTEGRAL MOC), Jochen Greiner (MPE, future SPI co-PI), Lorenzo Natalucci (IACHEC; 26 Nov)
 - Three IUG members need to be replaced by July 2020:
Diego Götz (F), Angela Malizia (I) & Diego Torres (ES) 
- Any suggestions for replacements?



Updates since last meeting

- 17 Oct: happy birthday INTEGRAL – 17 years of operations
- "15-year" review section "INTEGRAL reloaded" – ongoing (still some inputs missing...)

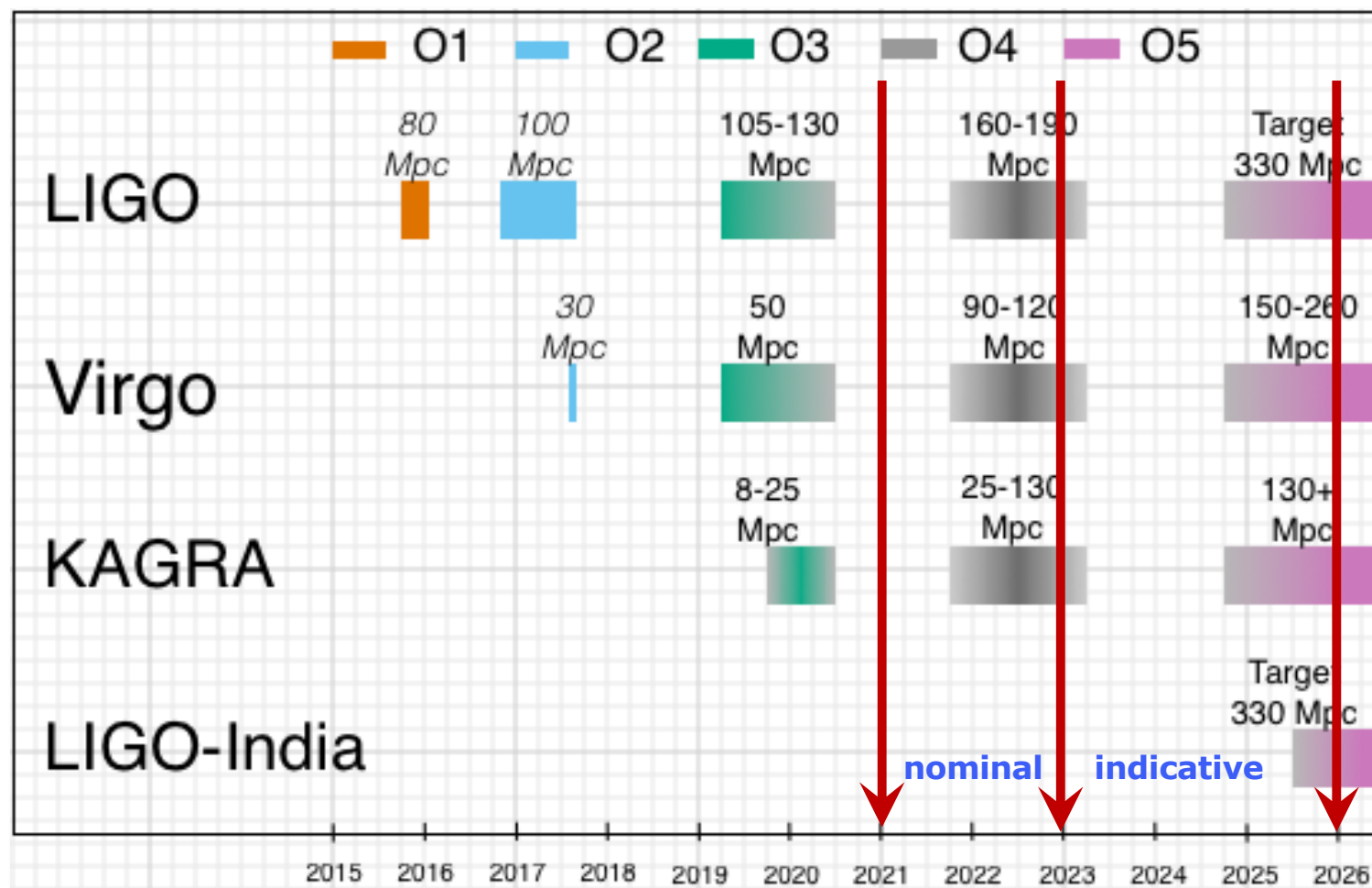


Near future (1)

- End of this year & early next year – Extension science case work (nominal 2021/2022, indicative 2023, 2024, 2025):
 - 26/27 Feb – Mission Operations Extension Review = MEOR (PS presentation ready by 11 Feb)
 - End March – extension science case ready
 - 12/13 May – AWG (PS presentation extension science case)
 - 19/20 May – SSAC; 9/10 June – SPC

[Remember: re-entry still in 2029...]

[INTEGRAL] Community interfaces - II



Abbott, B.P. *et al.* (KAGRA, LIGO Scientific & Virgo Collaboration)
Submitted to Living Reviews in Relativity
LIGO Document P1200087-v57

[INTEGRAL] Community interfaces - III



		Area (deg ²) 90% c.r.	Area (deg ²) 90% c.r.	Area (deg ²) 90% c.r.
O3	HLV	250 – 310	310 – 390	250 – 340
O4	HLVK	29 – 48	48 – 69	33 – 47

90% CR O5 BNS	% within	5 deg ²	23–30
		20 deg ²	65–73
	Median/deg ²		9–12

Abbott, B.P. *et al.* (KAGRA,
LIGO Scientific & Virgo
Collaboration)
*Submitted to Living Reviews in
Relativity*
LIGO Document P1200087-v57

B.P. Abbott *et al.* 2018, Living
Reviews in Relativity, 21:3



Near future (2)

➤ AO-18 Observing Time proposals:

- Release of AO-18: call for proposals: **2 March 2020**
- Deadline for submission of proposals: **3 April 2020 (14:00 CEST)**
- Meeting of the TAC: **18-20 May 2020**
- Start of AO-18 cycle of observations: **1 January 2021**

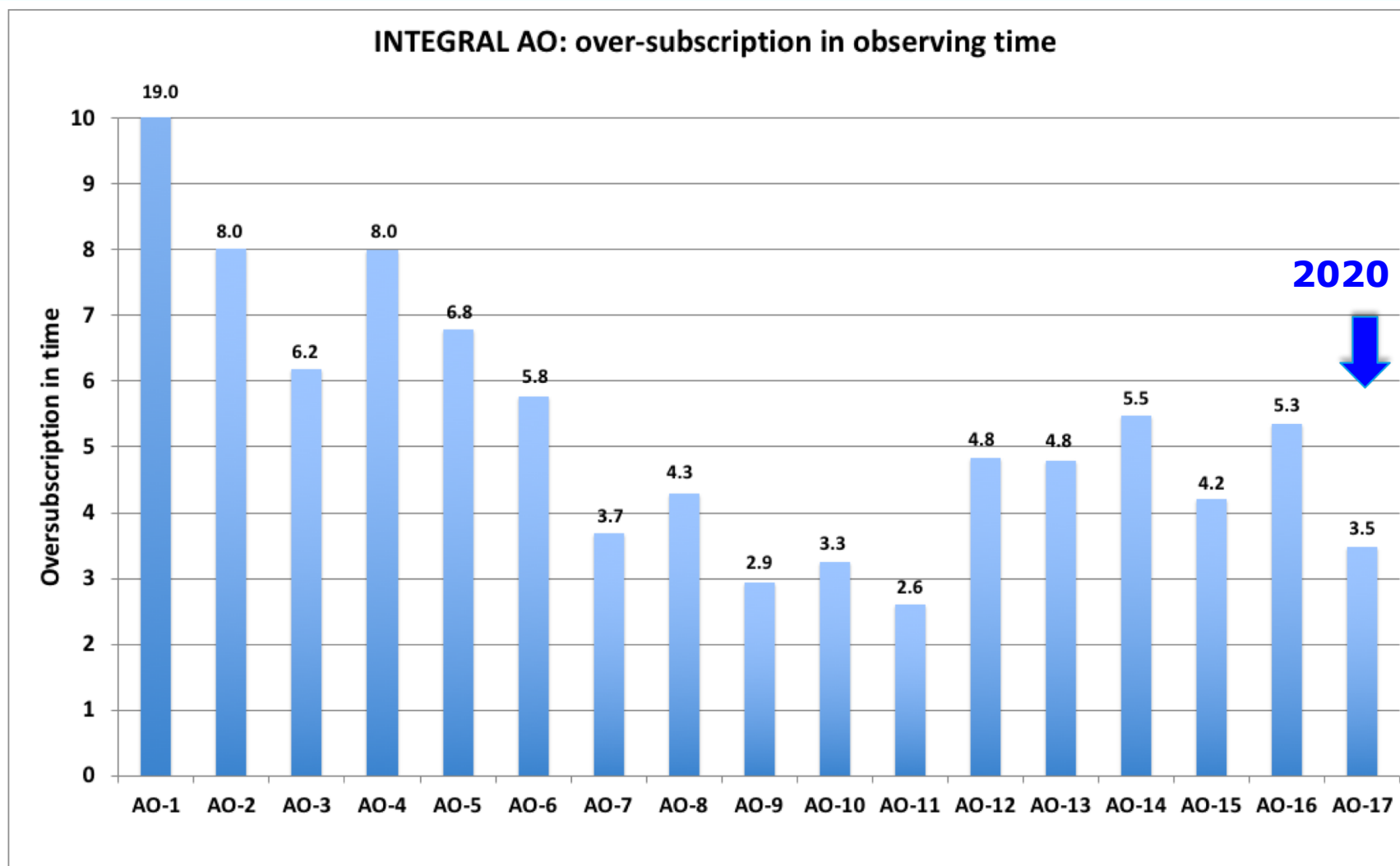
➤ AO-18 TAC:

- Brian McBreen (UCD, Ireland) will take over from Ed van den Heuvel as TAC chair for AO-18
- New TAC members: suggestions?

➤ AO-18 Coordination:

- **TBC:** XMM-Newton (300 ksec), Swift (150 ksec) & NuSTAR (100 ksec) [& Fermi through their AO]
- To be notified: INTEGRAL users, HEAD, Swift/NuSTAR community
- To be notified: Chinese/Indian/Japanese high-E community
- More ideas to foster cooperation & INTEGRAL awareness?!

[INTEGRAL] AO-17 – results



A small icon of the INTEGRAL satellite, showing its complex structure with various instruments and solar panels.

Community interfaces

A small icon of the INTEGRAL satellite, showing its complex structure with various instruments and solar panels.

Observatory status

A small icon of the INTEGRAL satellite, showing its complex structure with various instruments and solar panels.

Science highlights

A small icon of the INTEGRAL satellite, showing its complex structure with various instruments and solar panels.

Outreach



Update since last meeting

➤ Cross-calibration/coordinated observation:

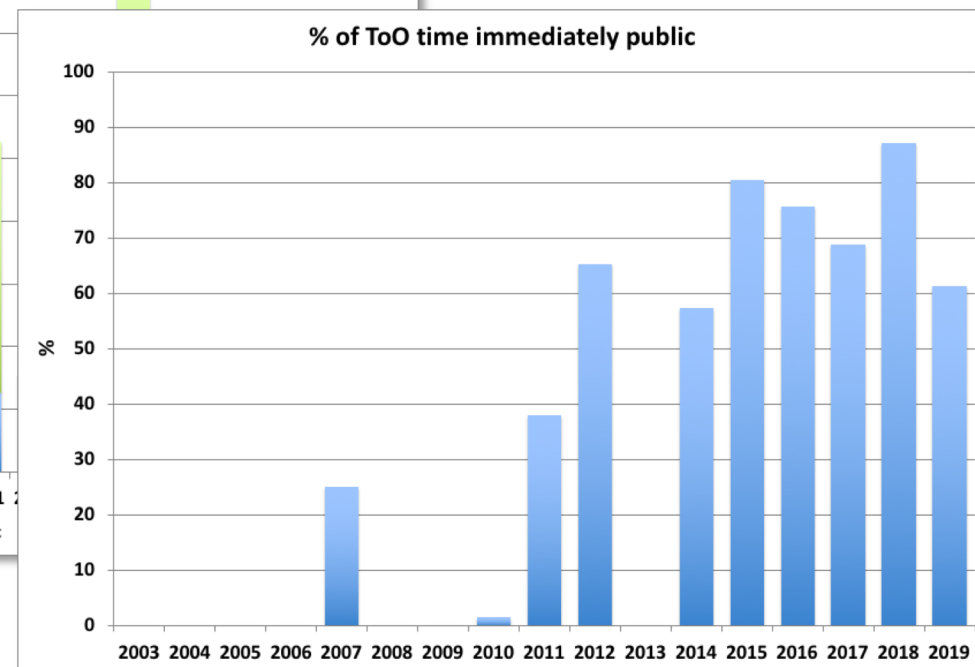
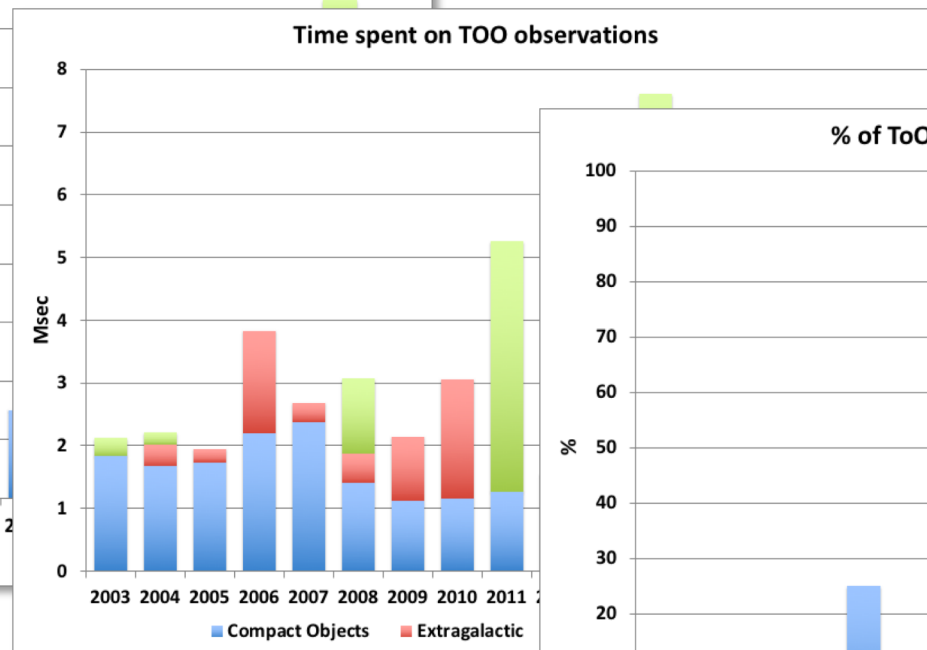
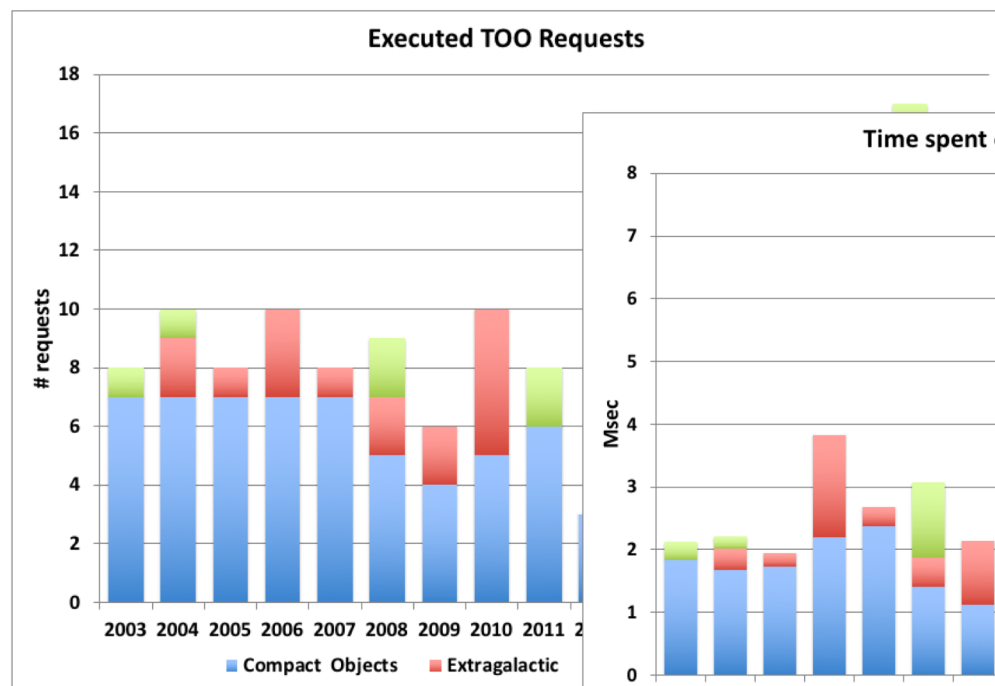
- i. 31 July – 2 August 2019: ToO on IceCube 190730A / QSO B1502+104 (PI: Savchaneko), coordinated with *XMM-Newton*
- ii. 30 August – 6 September: ToO on FRB121102 (PI: Gouiffes), coordinated with radio (e.g., *Nancay*, *Effelsberg*) as well other wavelengths (mm, optical, very-high energy, i.e., including *ALMA*, *GTC*, *MAGIC*)
- iii. 30 – 31 July: "ToO" on Cen X-3 (Public), coordinated with *Spectr-RG/ART-XC* (1st light)
- iv. 11 – 13 October: ToO on GRS1915+105 in extended low hard flux state (Public), coordinated with *XMM-Newton*
- v. 28 – 31 October: Quasi-simultaneous calibration observation on Crab, coordinated with *NICER*, *NuSTAR*, *XMM-Newton*, *ART-XC*, *HaloSat*

➤ 4 GRBs in FOV: GRB190701B, GRB190719B, GRB190828D, GRB190919B

[INTEGRAL] Observatory status

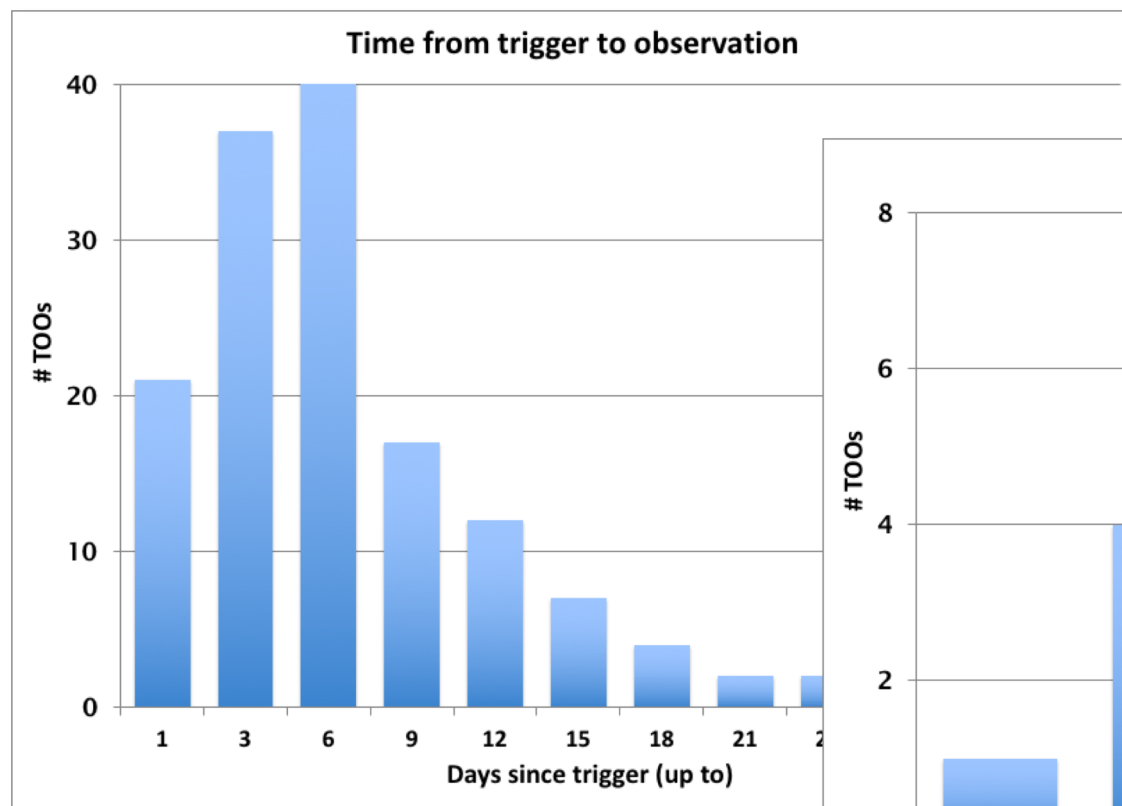


INTEGRAL ToOs (up to November 2019)

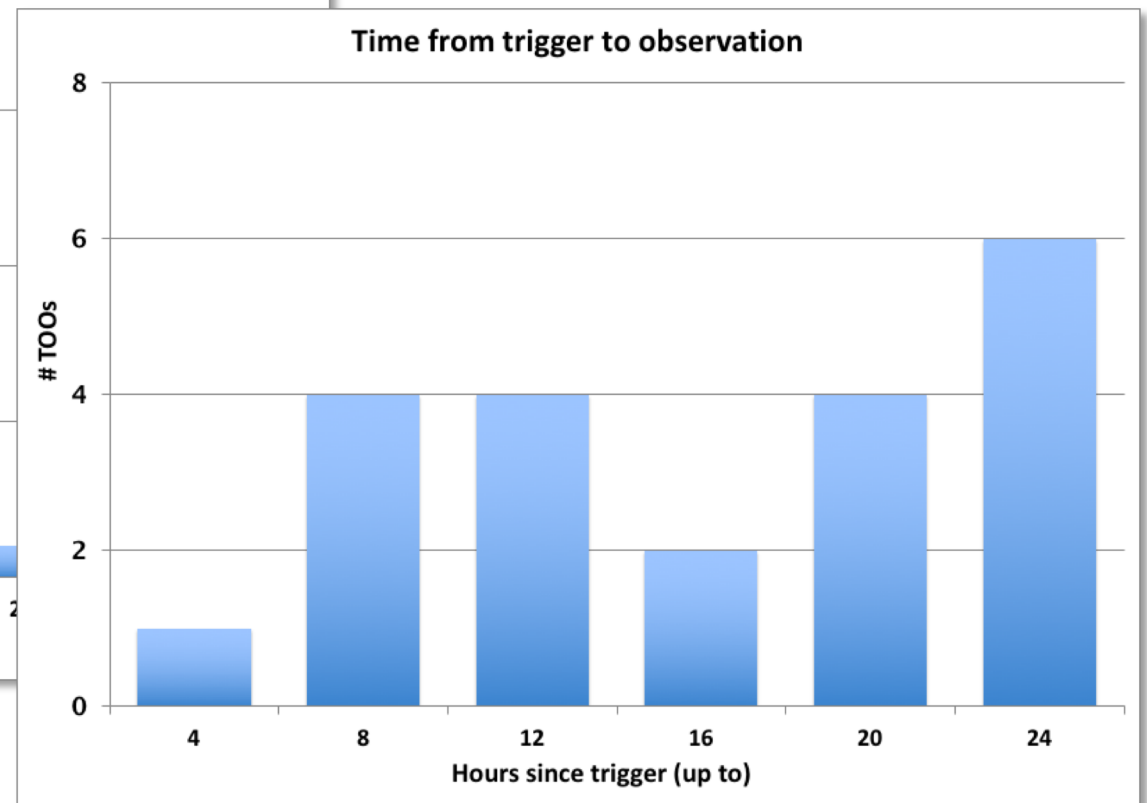


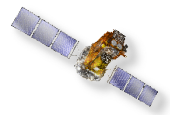
👉 since last meeting: 6 ToOs
(including IceCube 190730A,
FRB121102, AT2019pev)

INTEGRAL ToOs (up to November 2019) - continued



fastest: 3.7 hr (2019) = fast ToO test

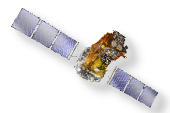




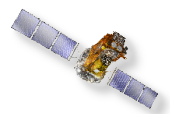
Observatory status



Community interfaces

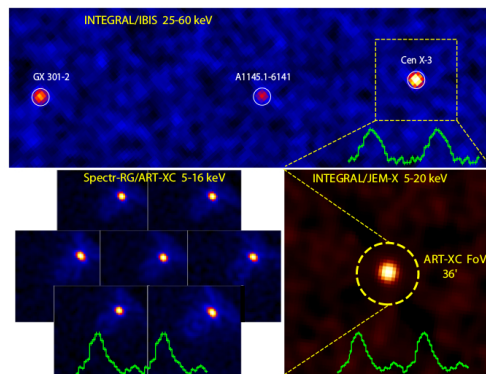
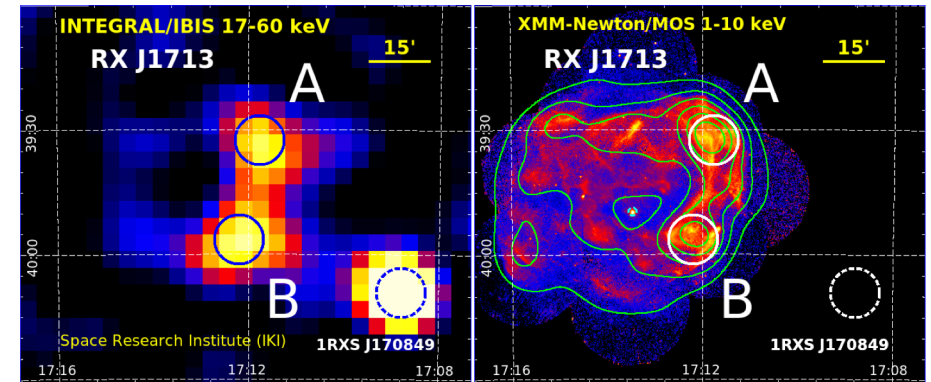
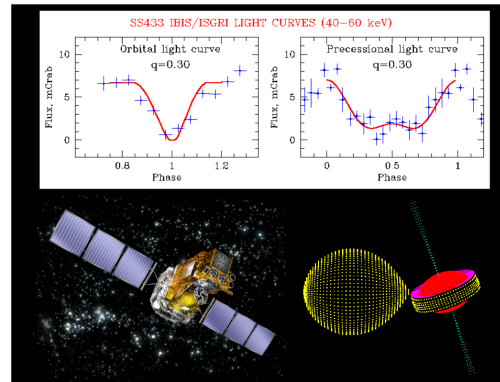
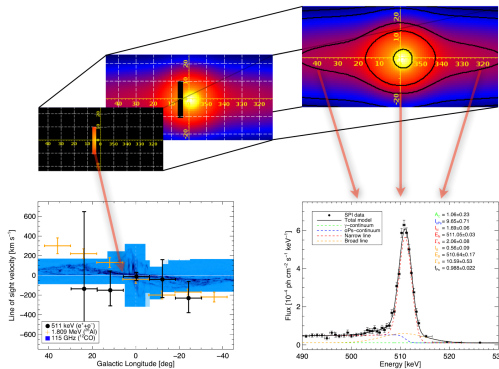


Science highlights



Outreach

[INTEGRAL] Science highlights (POM)



INTEGRAL POM: <http://www.cosmos.esa.int/web/integral/pom-archive>

[INTEGRAL] Science highlights - II

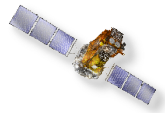


- O3 (started 1 April 2019):
 - 20 GW events reported after last meeting (33 total)
 - ✓ 12 BH–BH mergers (23 total)
 - ✓ 4 NS–BH mergers (4 total)
 - ✓ 2 NS–NS mergers (4 total)
 - ✓ 2 with sources between 3 & 5 M_{\odot}
 - No prompt (INTEGRAL) hard X-ray/gamma-ray counterparts with usual upper limits

[GCN Circulars #24925, #24951, #25010, #25029, #25119, #25166, #25190, #25323, #25500, #25505, #25605, #25698, #25709, #25755, #25815/25825, #25837, #25872, #25880, #26187, #26207]

- 9 high-energy neutrino events since last meeting:
 - IceCube-190704A, IceCube-190712A, IceCube-190730A, IceCube-190819A, IceCube-190922A, IceCube-191001A, IceCube-191119A
 - HAWC-190806A, HAWC-190916A
- no prompt hard X-ray/gamma-ray counterpart with usual upper limits

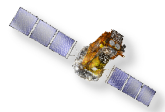
[GCN Circulars #24985, #25058, #25232, #25309, #25403, #25774, #25803, #25914, #26259]



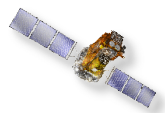
Observatory status



Community interfaces

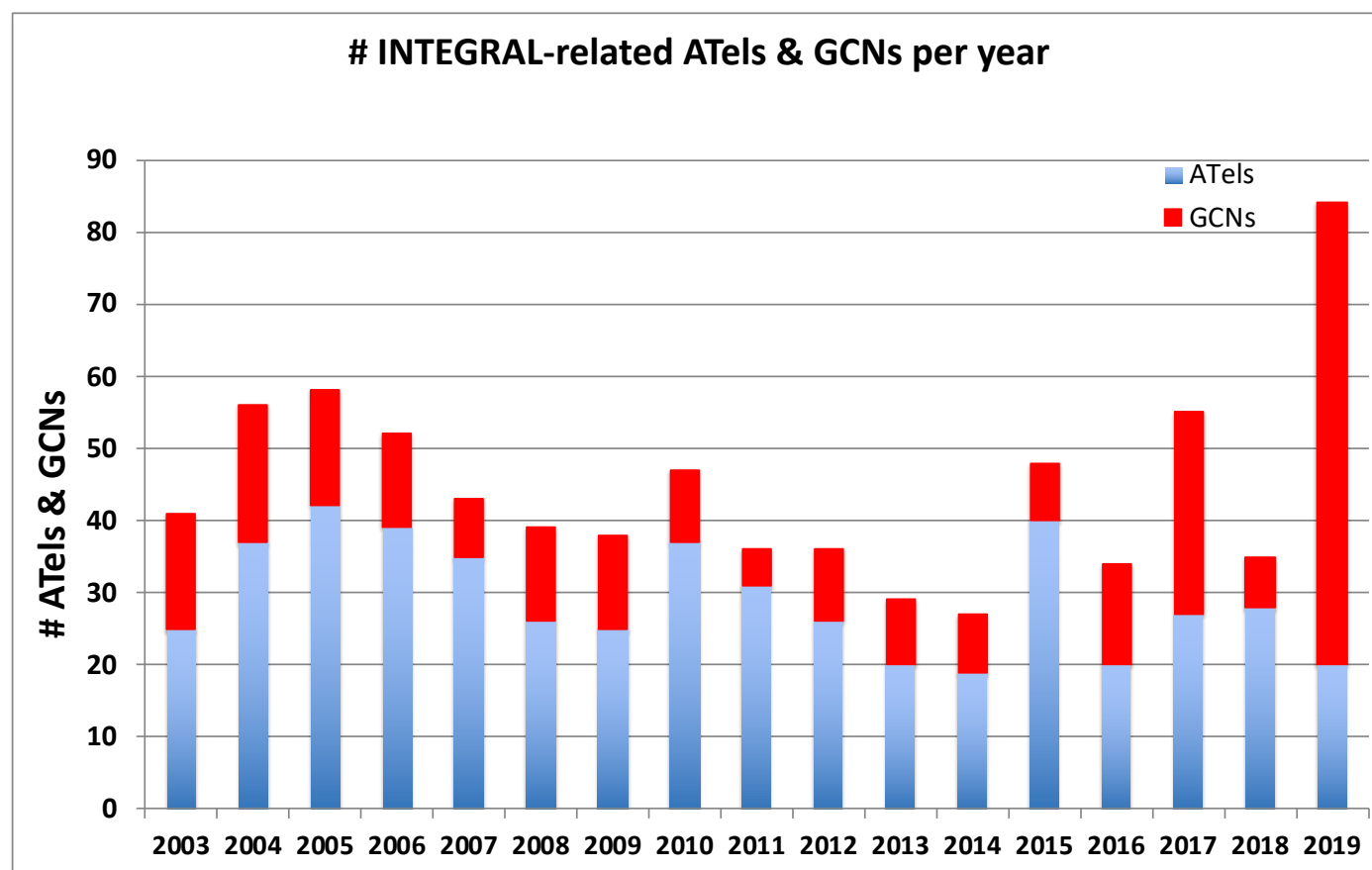


Science highlights



Outreach

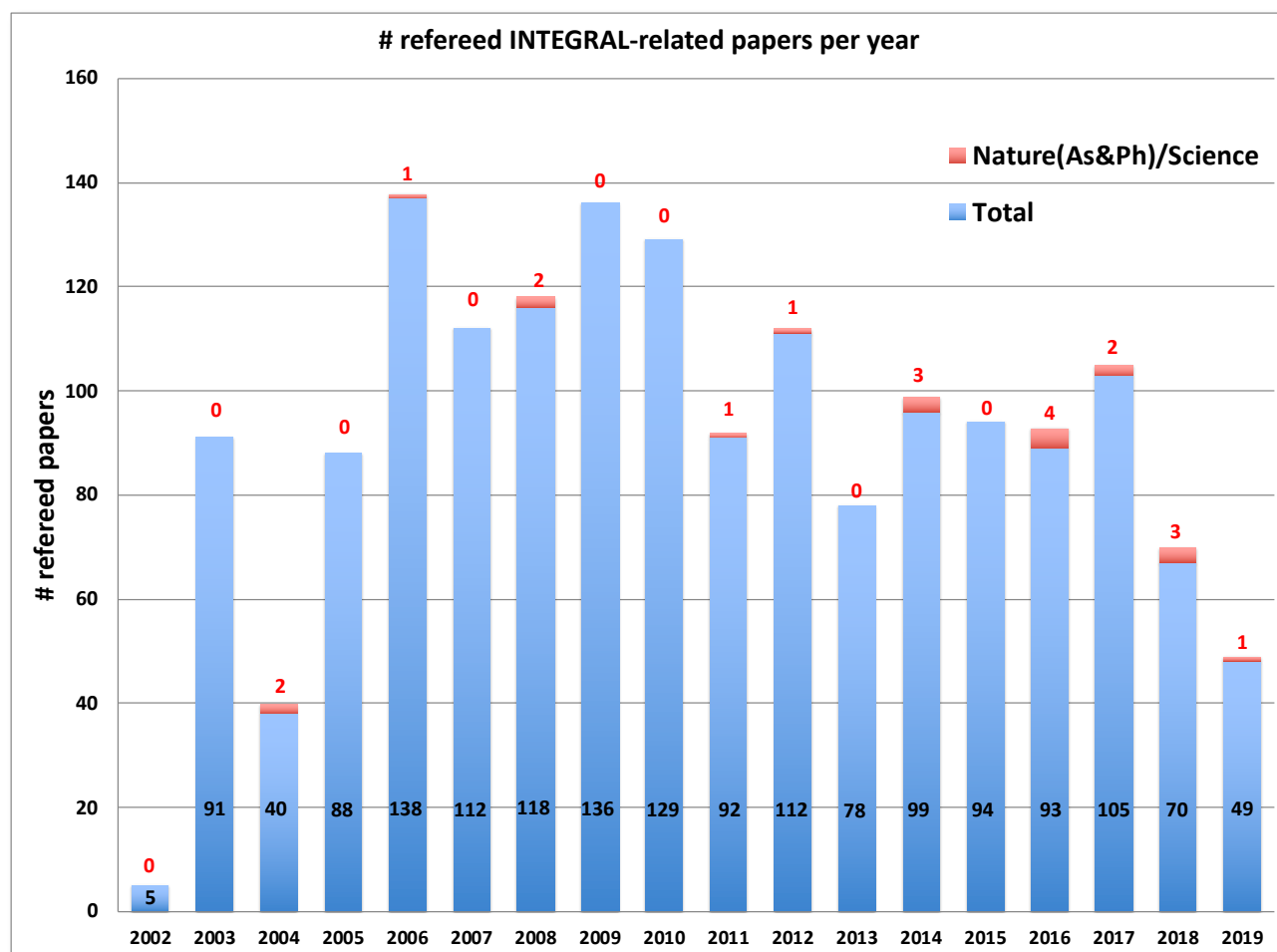
Quick notifications of discoveries/follow-ups



(as of 20 November 2019)

- 👉 2015: 25% (Atels) on V404 Cygni
- 👉 2017, 2019: GCNs – GWs!

Refereed papers statistics



Total since launch, up to
20 November 2019:
1649 refereed

👉 2015-2019:
39 papers using V404 Cyg
immediately public ToO data

👉 2018-2019: Decline...?





Status since last meeting (11+12 June 2019)

ESA's INTEGRAL-related PR web-stories

ESA missions team up to map cosmic rays across Solar System

12 November 2019

stories in:

2019	-	3
2018	-	2
2017	-	5 (3 GW)
2016	-	3
2015	-	3

As always...: suggestions and proposals for new outreach products
welcome!
(not only Nature or Science papers...)

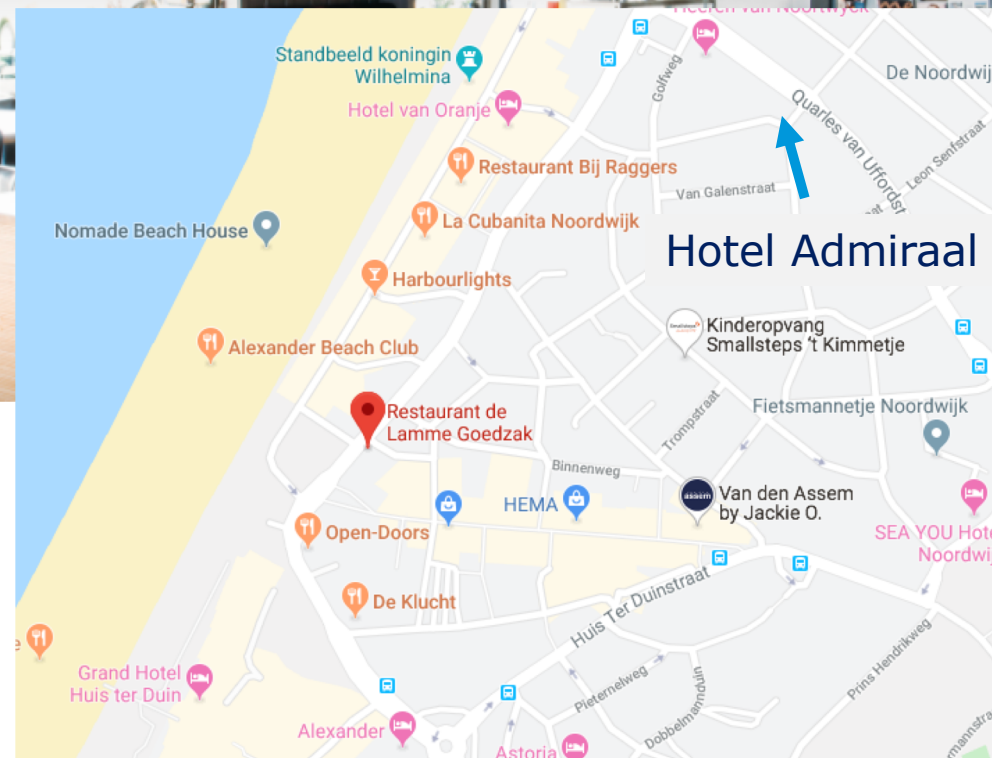


Miscellaneous

[INTEGRAL] Dinner tonight



Restaurant "De Lamme Goedzak"
Parallel Boulevard 18, Noordwijk



@19:00 - Who's joining?

[INTEGRAL]



That's it for now