IBIS/ISGRI STATUS

Philippe Laurent, Jérome Rodriguez, Floriane Cangemi, Christian Gouiffès, Aleksandra Gros, Aymeric Sauvageon, Geoffrey Daniel, Alexis Coleiro, Sarah Antier

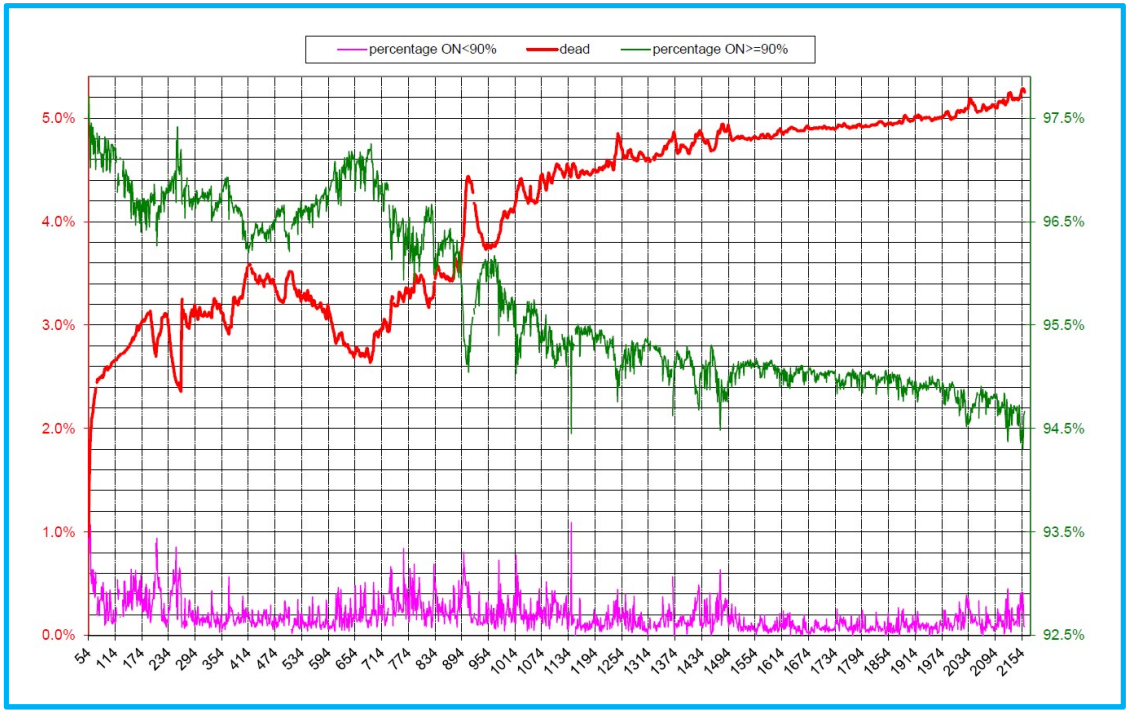
CEA/DRF/IRFU/DAp & APC

IUG#23 26/11/2019

ISGRI OPERATION

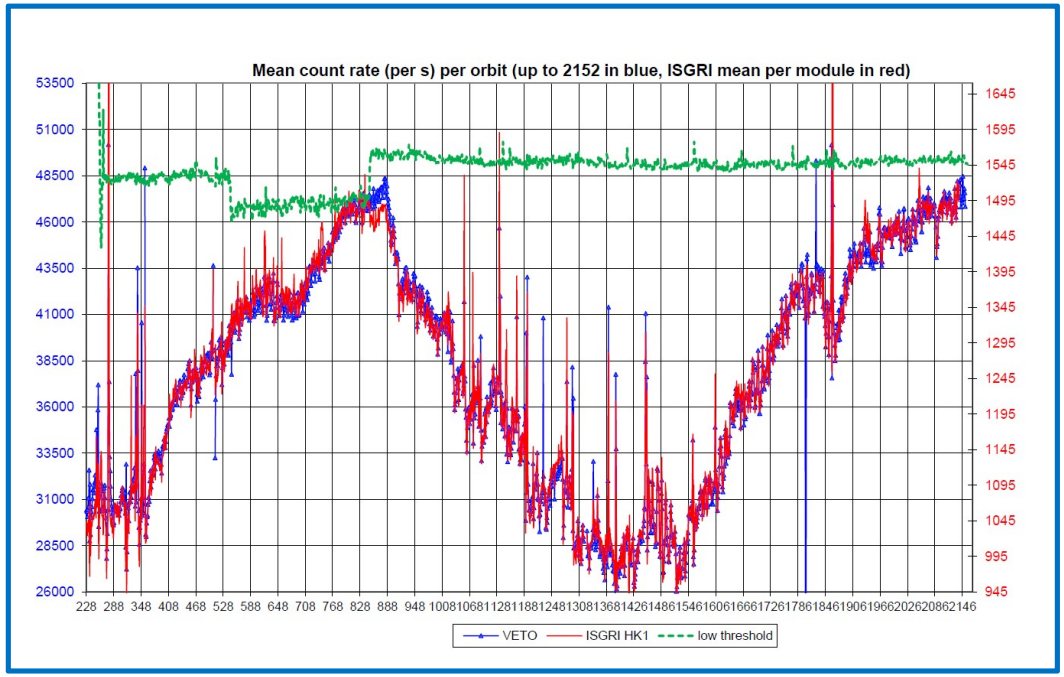
Dead pixels

The percentage of dead pixels is still very slowly rising (around 5%).



ISGRI/Veto Background

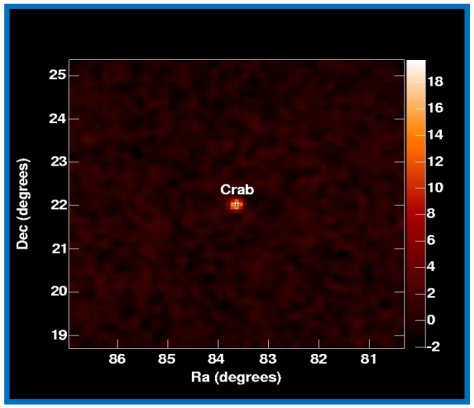
As solar activity goes to minimum, ISGRI raw count rate increases (due to cosmic rays increase, seen by VETO rate).

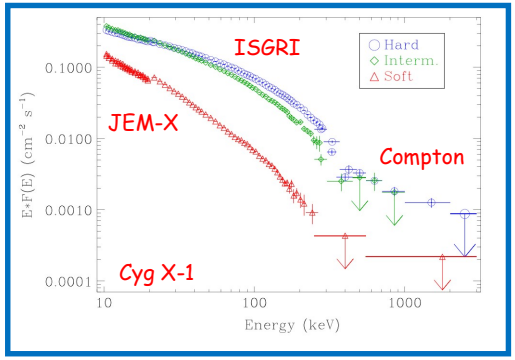


COMPTON SOFTWARE

Compton mode data analysis

- **Compton :** Delivery to ISDC of Compton software to make images and spectra is underway.
- We made a first delivery of ic_MosaIma and dal3ibis-calib to ISDC.
- Dal3ibis-calib is OK.
- Some works remain to be done at CEA for ic_MosaIma.
- We plan to write a paper on the Compton mode software development in the next months.
- **OSA11** : We have begun to write the frame of the ISGRI calibration report.



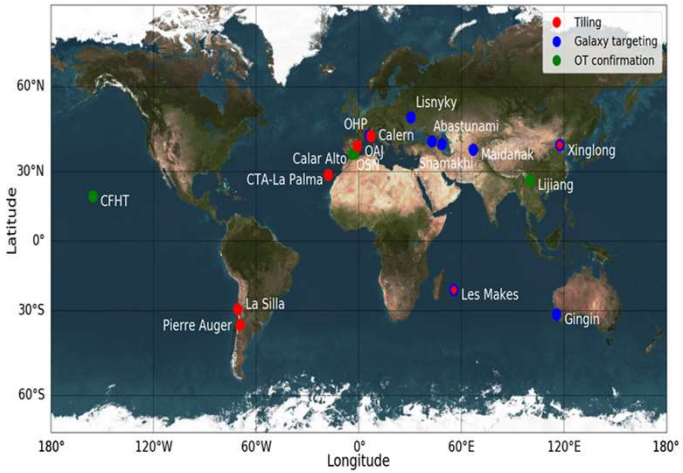


SCIENCE

Multi-messengers, polarization, compact objects

- On-going multi-messenger activity at Paris/Saclay
  - Participation to the MM team shift (A. Coleiro).
  - Development of a true Compton imaging software (G. Daniel).
  - Development of the “GrandMa” network (S. Antier).
- Several polarization studies are on-going :
  - Cygnus X-1 (Cangémi, F. & Rodriguez, J.)
  - V404 Cygni (Chang, B. PHD thesis)
  - GRBs (Götz, D.)
  - Crab total and phase-resolved (Gouiffès, C.)
- CDD 1 year CNES position for science studies in discussion …

Global Advanced Network Devoted to Multi-messenger Addicts



- **Coordination of the telescopes**
- **27/33 alerts distributed for O3a**
- **16 min for minimal reactivity**

Antier et al., MNRAS, 2019

23 telescopes - 17 observatories
11 countries - 70 scientists

Identify and characterize the GW electromagnetic counterpart:

photo: up to 23 mag

spectro: up to 20 mag

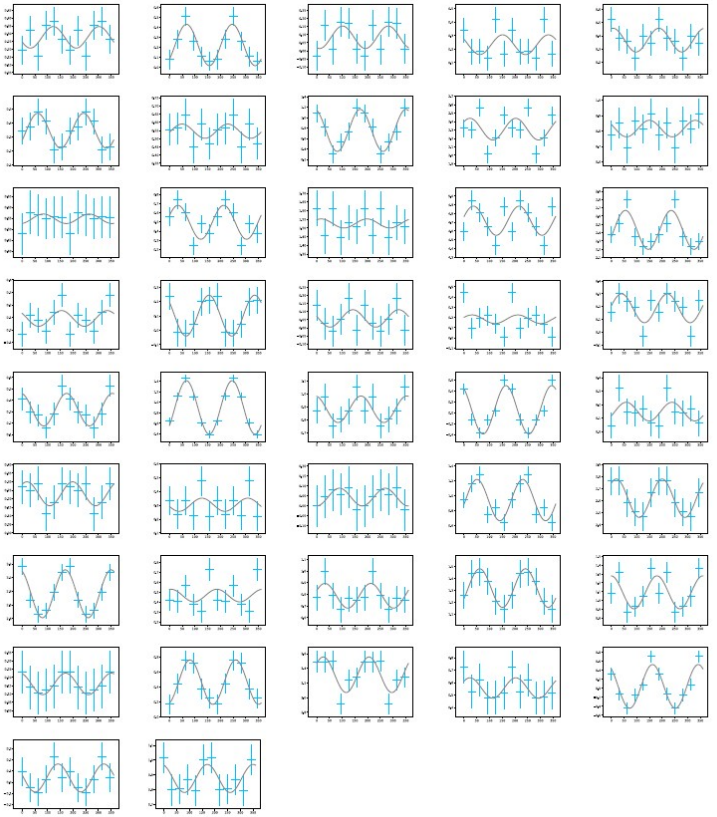
V404 polarization (B. Shang)

- B. Shang PHD thesis partly on V404 Cygni held on November 5th in Hsinchu (Taïwan).
- Following the study shown during the Amsterdam conference (2016, see below), we decided to look at the variation of the polarization during rev. 1555 on scw timescale (change in PA and PF).

Revolution number	1554	**1555**	1556	1557	1558	1559	1560	1561	1562	1563
Exposure time (ks)	170	**149**	84	153	163	171	93	165	174	117
S/N	8.8	**14**	4.6	28	-0.4	-0.2	-0.05	1.26	1.75	1.09
Polarization detected (yes/no)	No	**Yes**	No	No	No	No	No	No	No	No

V404 polarization (B. Shang)

- Study of the variation of the polarization during rev. 1555 on scw timescale (change in PA and PF).
- Study of the possible correlation with the presence/absence of magnetic field, measured through spectral fitting.



Context

- Fast radio bursts (FRB) are millisecond-duration transient radio signals
- Discovered in 2007 from Parkes archival pulsar data survey (Lorimer's burst)
- From DM (Dispersion measure), extragalactic origin favored
- On 2019, Nov 100 FRBs registered (source : FRBCAT catalog), among them 10 repeaters
- Host galaxy identified in 4 cases
- Fast and active magnetar inside a dense environment favored model but many alternative theories exist
- Several models predict extended gamma-ray emission
- Several multi-lambda programs

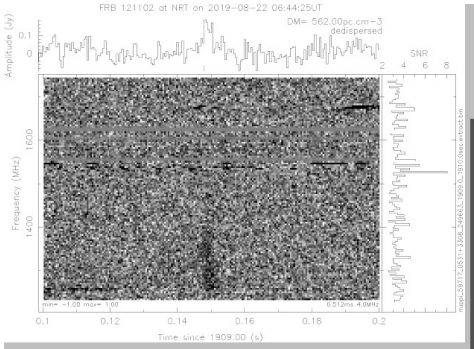
History: September 2017 : Integral regular observations (2 revolutions), severa Radio facilities involved (Nançay, Effelsberg, Arecibo, Green Bank, Fast), Optical : OHP T193cm+GASP (Galway Fast polarimeter), T120cm+CCD, VHE participation (Hess, Veritas, Magic)

→ *No radio bursts detected during this campaign (+ unforseen pb with Arecibo and NRT)*

→ **New strategy** adopted for **2019 (AO16)** : ToO mode, trigger based on the regular radio monitoring of FRB121102 with NRT

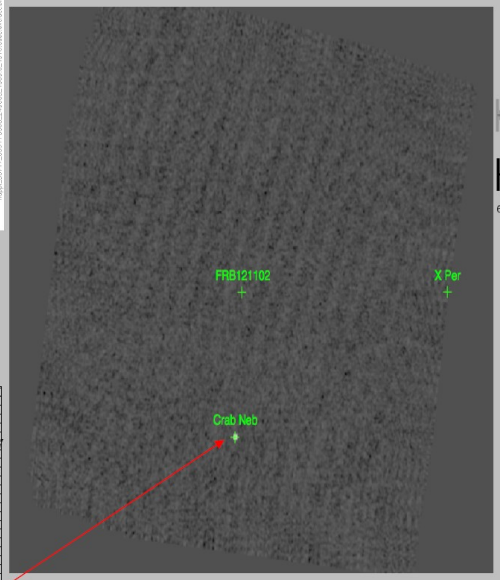
→ Source active in late August 2019 (NRT-Nançay) → ToO INTEGRAL (500 ksec)

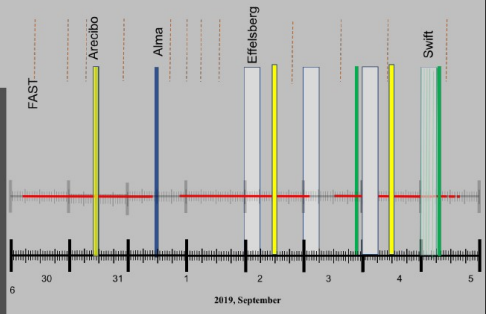
2019 FRB Campaign



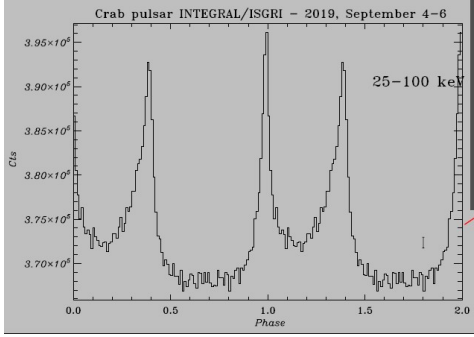
NRT Nançay

2019 September campaign

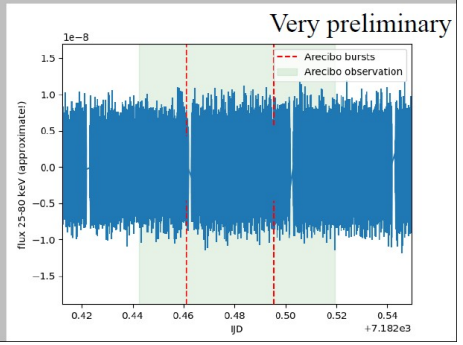




MWL coverage



Very preliminary



2019 FRB Campaign

中国科学院
CHINESE ACADEMY OF SCIENCES

FAST Detects Multiple Bursts from Fast Radio Burst 121102

Sep 09, 2019

Five-hundred-meter Aperture Spherical Radio Telescope (FAST), the world largest single dish radio telescope, began commissioning on 25th September, 2016. In February 2019, it announced call for proposal publicly to Chinese astronomers. More than 133 proposals from 21 institutions including the University of Hong Kong were received. Granted proposals started to arrange observations on 18th April, 2019.

In its recent tracking observation of the Fast Radio Burst (FRB) FRB121102 using FAST L-band 19-beam receiver (with FWHM of ~2.95' for individual beam), FAST detected multiple bursts.

The bursts were firstly identified by the FAST FRB backend on August 29th (UT), which performs real time signal processing of 19-beam data and automatic candidate selection/triggering. The subsequent single pulse search using multiple pipelines have turned up many tens of pulses with significant SNR in observations carried out so far, from 29th August to 3rd September (UT).

The total number of bursts detected from FRB121102 this time is known to be the highest by far. Careful cross-check and further processing are being carried out.

FAST FRB backend was developed by researchers from the National Astronomical Observatories of the Chinese Academy of Sciences (NAOC), and the collaborators from UC Berkeley, Beijing Normal University and Xinjiang Astronomical Observatory of the Chinese Academy of Sciences. It passed technical review and final project review in November 2018 and was rated as excellent NAOC project.

The FAST FRB backend system has high-efficiency real-time pulse capture capability, and can observe in parallel with most observation tasks. It will play an important role in the discovery of new FRBs, improving the position accuracy and capturing the high-resolution absorption lines generated by FRB in real time.

FRB are the brightest burst in radio-band currently known in the universe, but there is no reasonable explanation for their origin. The repeated bursts detection of FAST will promote the research on understanding the origin and physical mechanism of FRB.

FAST has been targeting FRB 121102 since April 2019, and is executing more observations under the auspice of engineering testing time and multiple approved PI-led programs. In addition to the regular on-going FRB follow-up programs, the current observation was also motivated by timely and valuable alerts from the colleagues in the INTEGRAL team, Arecibo team, Max-Plank Institute for Radio Astronomy, Berkeley, and Cornell University.

Address: http://english.cas.cn/

[Previous | Next | ADS]

INTEGRAL and radio joint programme of FRB121102 during a renewed activity

ATel #13073; *Christian Gouiffes (CEA Saclay), Laura Spitler (MPIfR), Ismael Cognard (CNRS Orl&Cnrs), Amaelle Maury (CEA Saclay), Jason Hessels (University of Amsterdam), Andrew Seymour (Obs. Arecibo), Di Li (NAOC), Philippe Laurent (CEA Saclay), Emeric Le Floc'h (CEA Saclay), Eoin O'Connor (NUI Galway), Stà©phane Corbel (CEA Saclay), Mary Cruces (MPIfR), Michel Denneefeld (IAP), Diego Gà©tz (CEA Saclay), Lei Qian (NAOC), Volodymyr Savchenko (ISDC Geneva), Andy Shearer (NUI Galway), Jerome Rodriguez (CEA Saclay), Philippe Zarka (Observatoire de Paris)*
on 3 Sep 2019; 19:28 UT
Credential Certification: Jerome Rodriguez (jrodriguez@cea.fr)

Subjects: Radio, X-ray, Gamma Ray, Transient, Fast Radio Burst

Referred to by ATel #: 13098

Tweet

Here we report on a renewed activity of the repeating fast radio burst FRB121102. During an on-going programme involving the INTEGRAL satellite in hard X-rays, the Arecibo, Effelsberg, and the Nançay radio telescopes, several radio bursts were detected in the last days. Previous activity of the source has also been reported using the FAST telescope (ATel #13064).

Our last observation on September, 3rd indicates that FRB121102 is still active and our monitoring of the source will continue in the coming days according to the following schedules :

- INTEGRAL observations will continue till 2019, September 6 05:00 UTC (revolution 2132 and 2133, see detailed scheduling information at https://www.cosmos.esa.int/web/integral/schedule-information)

- Nançay will observe on:

04.09.2019 05h59 -> 06h59 UT

05.09.2019 05h55 -> 06h55 UT

06.09.2019 05h51 -> 06h51 UT

- Effelsberg will observe on:

4.9 from 0:15 to 7:00 UTC

[Previous | Next | ADS]

FAST Detects Multiple Bursts in L-band from FRB 121102

ATel #13064; *Di Li (NAOC), Xinxin Zhang (NAOC), Lei Qian (NAOC), Weiwei Zhu (NAOC), Ran Duan (NAOC), Dan Werthimer (Berkeley), Vishal Gajjar (Berkeley), Yan Zhu (NAOC), Jeff Cobb (Berkeley), Youling Yue (NAOC), Chenglin Jin (NAOC), Bing Zhang (UNLV), Christian Gouiffes (CEA), Shen Wang (NAOC), Laura Spitler (MPIfR), Mary Crucex (MPIfR), Jason Hessels (University of Amsterdam), Andrew Seymour (Arecibo), Eric Korpela (Berkeley), Jingtian Luo, HengQian Gan (NAOC), Peng Jiang (NAOC), Hui Li (NAOC), Qi Li (NAOC), HongFei Liu (NAOC), Chenchen Miao (NAOC), Chenhui Niu (NAOC), GuoFeng Pan (NAOC), Zhichen Pan (NAOC), Bo Peng (NAOC), JingHui Sun (NAOC), Ningyu Tang (NAOC), QiMing Wang (NAOC), Pei Wang (NAOC), Xin Pei (SAO), Jun Yan (NAOC), Rui Yao(NAOC), DongJun Yu (NAOC), Mao Yuan (NAOC), Haiyan Zhang (NAOC), Lei Zhang (NAOC), ShuXin Zhang (NAOC), and and FAST Collaboration (NAOC)*
on 2 Sep 2019; 01:32 UT
Credential Certification: Di Li (dili@nao.cas.cn)

Subjects: Radio, Fast Radio Burst

Referred to by ATel #: 13073, 13075, 13090, 13098

Tweet

Tracking observations of FRB 121102 were carried out with the newly commissioned Five-hundred-meter Aperture Spherical radio Telescope (FAST). We used the FAST L-band Array of 19-beams (FLAO), which has a FWHM of ~2.95' for individual beams and a ~2deg footprint. The source was placed in the central beam, while all 19 beams were recorded. The bursts were firstly identified by the FRB backend on August 29th (UT), which performs real time signal processing of 19-beam data and automatic candidate selection/triggering. The subsequent single pulse search using multiple pipelines have turned up many tens of pulses with significant S/N in observations carried out so far, on the 29th, 30th, and 31st (UT). While careful cross-check are being carried out, the majority of these detections are expected to be credible. FAST has been targeting FRB 121102 since April of this year. In addition to the regular on-going FRB follow-up programs, the current observations was also motivated by timely and valuable alerts from our colleagues in the INTEGRAL team, Arecibo team, Max-Plank Institute for Radio Astronomy, Berkeley, and Cornell University. Given the significance of this source and its now apparent active state, FAST is executing more observations under the auspice of engineering testing time and multiple approved PI-led programs, which targeted FRB 121102. We encourage more ToO observations with other facilities.

FAST pulsar survey results

[Previous | Next | ADS]

MeerKAT detections of FRB 121102 at L-band

ATel #13098; *Manisha Caleb (University of Manchester), Benjamin Stappers (University of Manchester), Ewan Barr (MPIfR), Michiel Christiaan Bezuidenhout (University of Manchester), Laura Driessen (University of Manchester), Fabian Jankowski (University of Manchester), Michael Kramer (MPIfR), Mantasvi Malesani (University of Manchester), Vincent Morello (University of Manchester), Kaustubh Rajwade (University of Manchester), Sotiris Sanidas (University of Manchester), Weiwei Chen (MPIfR), Jason Wu (MPIfR), Sarah Buchner (SARAO), Rob Fender (University of Oxford), Lauren Rhodes (University of Oxford), Maciej Serylak (SARAO), Lee Townsend (UCT), Patrick Woudt (UCT), Jako Andrianjafy (University of Mauritius(DARA)), Nalini Heerallall-Isoor (University of Mauritius), Divya Hurwanth (University of Mauritius(DARA))*
on 11 Sep 2019; 13:24 UT
Credential Certification: Manisha Caleb (manishacaleb@gmail.com)

Subjects: Radio, Transient, Fast Radio Burst

Tweet

The MeerKAT telescope carried out observations of the FRB 121102 on 10 September 2019 at 03:00 UT, motivated by the source's recent activity as reported by various facilities (ATels #13064, #13073, #13090). MeerKAT performed the observations centred on 1284 MHz in the range of about 900-1670 MHz, as part of a Director's Discretionary Time Proposal. 384 coherent beams centred on the location of the burst were formed using the Max Planck Institute for Radio Astronomy beam former. Using the MeerTRAP real-time single pulse detection pipeline and backend, in our preliminary analysis we identified 12 repeat bursts in 5 hours of observing time. Further data analysis is ongoing. An example pulse can be seen in the link below. FRB 121102 is still active and we encourage multifrequency observations.

The MeerKAT telescope is operated by the South African Radio Astronomy Observatory (SARAO), which is a facility of the National Research Foundation, an agency of the Department of Science and Innovation. MeerTRAP acknowledges funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 694745). We would like to thank the Director, the operators and SARAO for scheduling these observations.

MeerKAT FRB 121102

New campaign in 2020 (AO17) in ToO, 3 orbits allocated