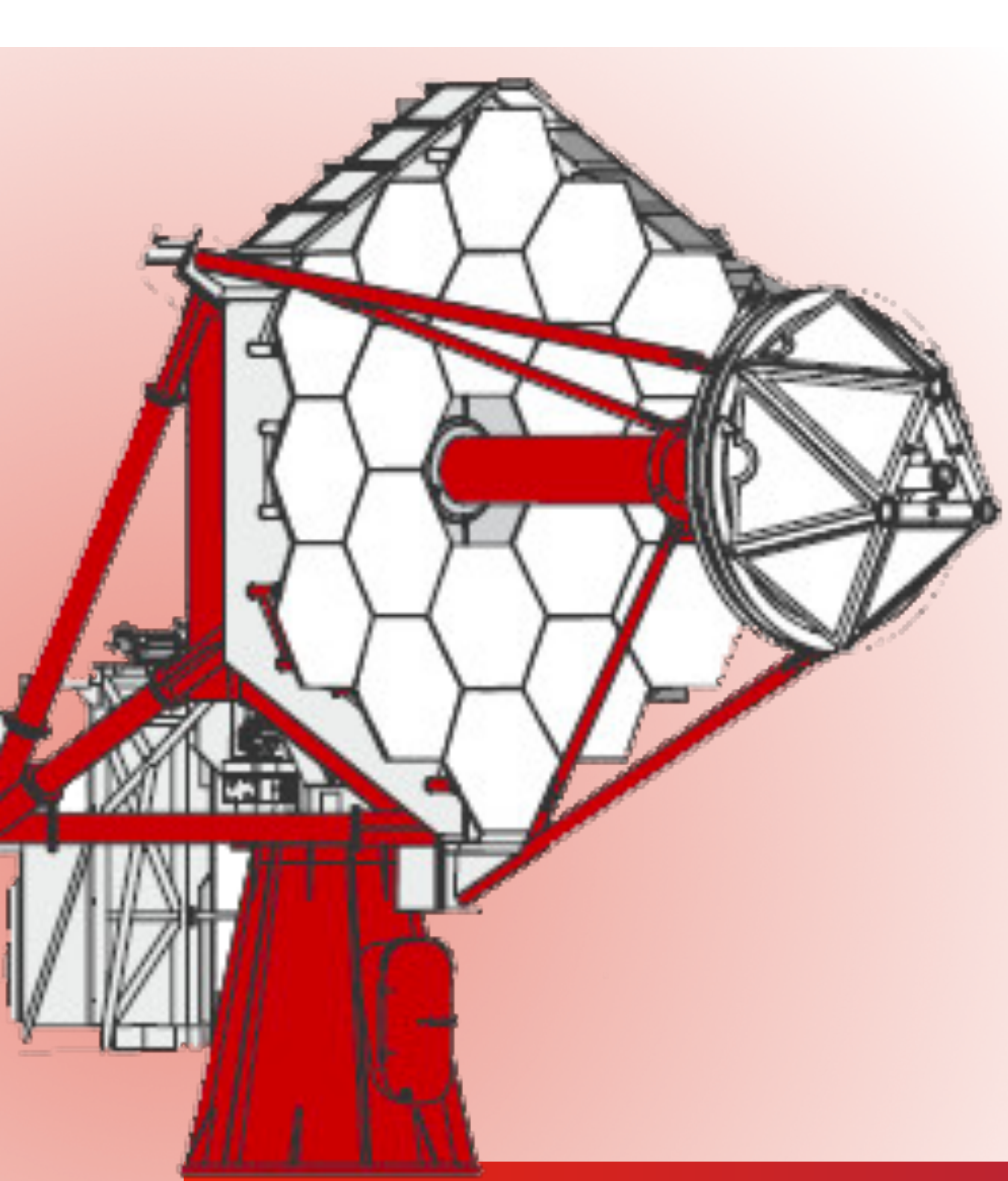
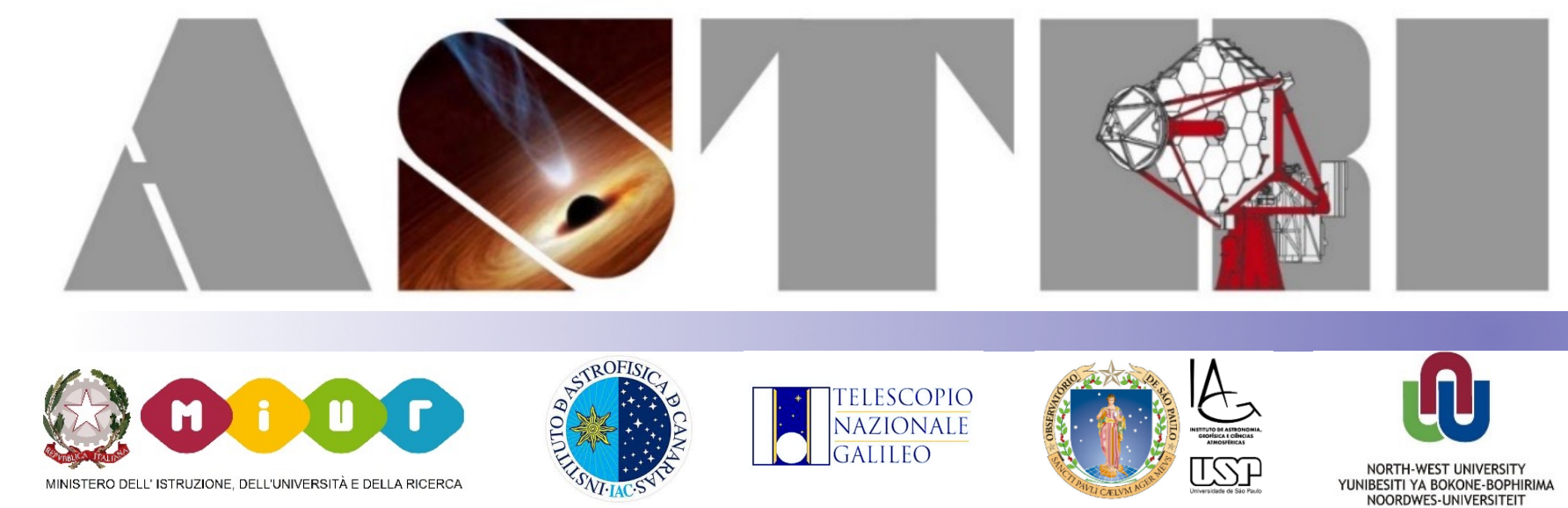




TeV Transients with the ASTRI Mini-Array

a case study with GRB 190114C



Antonio Stamerra (INAF - Osservatorio astronomico di Roma),
F. G. Saturni, J. G. Green, L. Nava, F. Lucarelli and L. A. Antonelli for the ASTRI project.
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antonio.stamerra@inaf.it, francesco.saturni@inaf.it, Jarred.green@inaf.it, lara.nava@inaf.it

TRANSIENT ASTRONOMY WITH THE ASTRI MINI-ARRAY

The Science core program of the ASTRI Mini-Array includes the study of the TeV-gamma-ray counterparts of:

- transients phenomena: gamma-ray burst (GRB), FRB, TDE,...
- multi-messenger events from gravitational-waves (GW) and astrophysical neutrino alerts

The transient program plans the follow-up of a few selected alerts, on GRBs, GW events and high-energy neutrinos. Main limitation is the absorption of $>1\text{TeV}$ gamma-rays by the extragalactic background light (EBL).

A STUDY CASE: PROSPECTS WITH GRB 190114C-LIKE GAMMA-RAY BURSTS

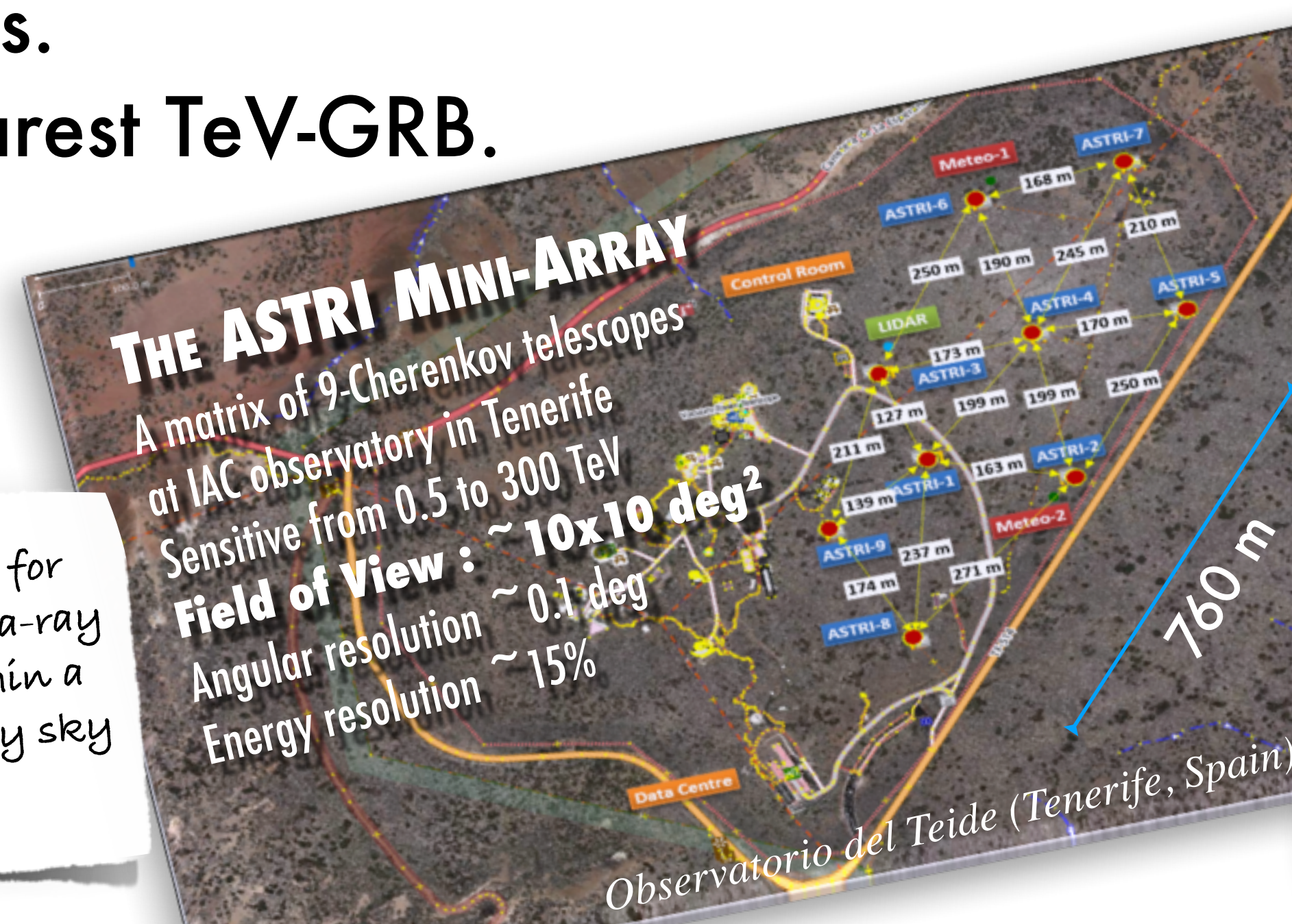
The long GRB 190114C ($z=0.42$) is the first TeV-detected GRB [1], showing a second energetic component [2], yet to be fully understood with future TeV observations on GRBs.

The long GRB 190829A ($z=0.078$) [3] is the nearest TeV-GRB.

REFERENCES

- [1] MAGIC collaboration 2019, Nature, 575, 455-458
- [2] MAGIC collaboration, et al. 2019, Nature, 575, 459
- [3] H.E.S.S. Collaboration et al. 2021, Science 372, 1081-1085
- [4] Lombardi, S., et al. (2018), Proc. SPIE, 10707

ideal instrument for searching gamma-ray counterparts within a large uncertainty sky region



The Science program with the ASTRI mini-array
Vercellone et al., this conference

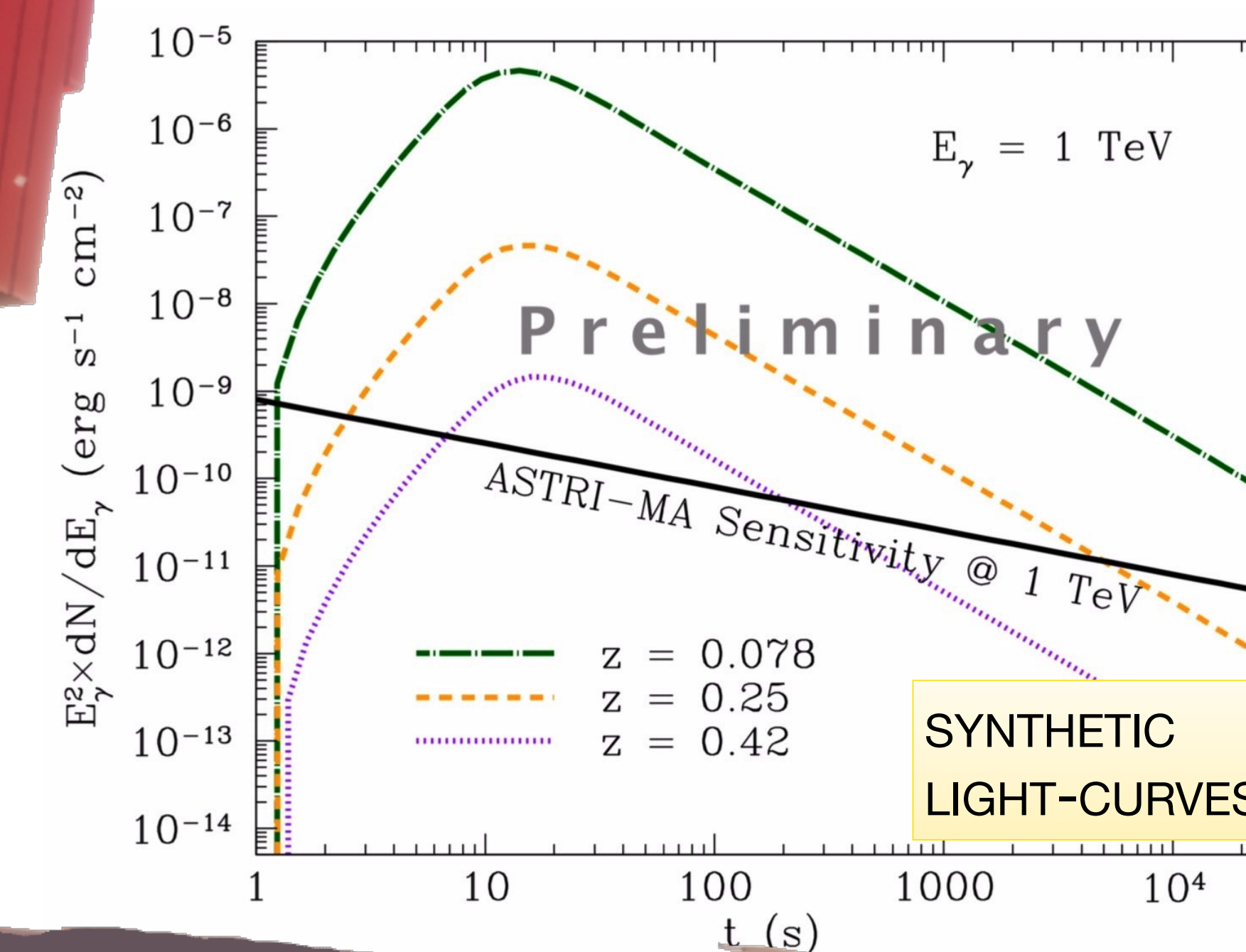
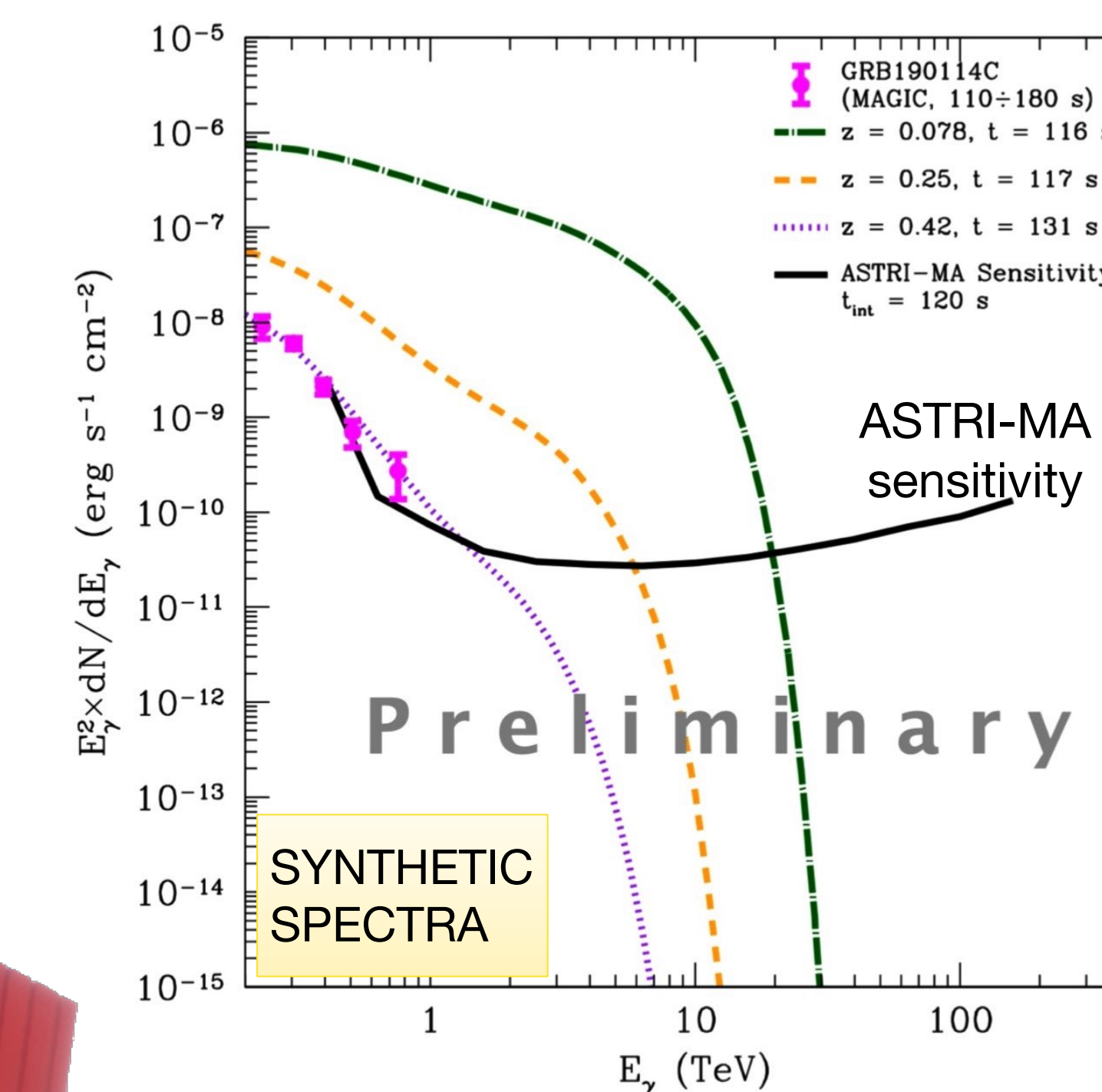
Performances of the ASTRI mini-array:
Lombardi et al., this conference

The ASTRI mini-array
Scuderi et al., this conference
Antonelli et al. this conference

SYNTHETIC SPECTRA AND LIGHT-CURVES

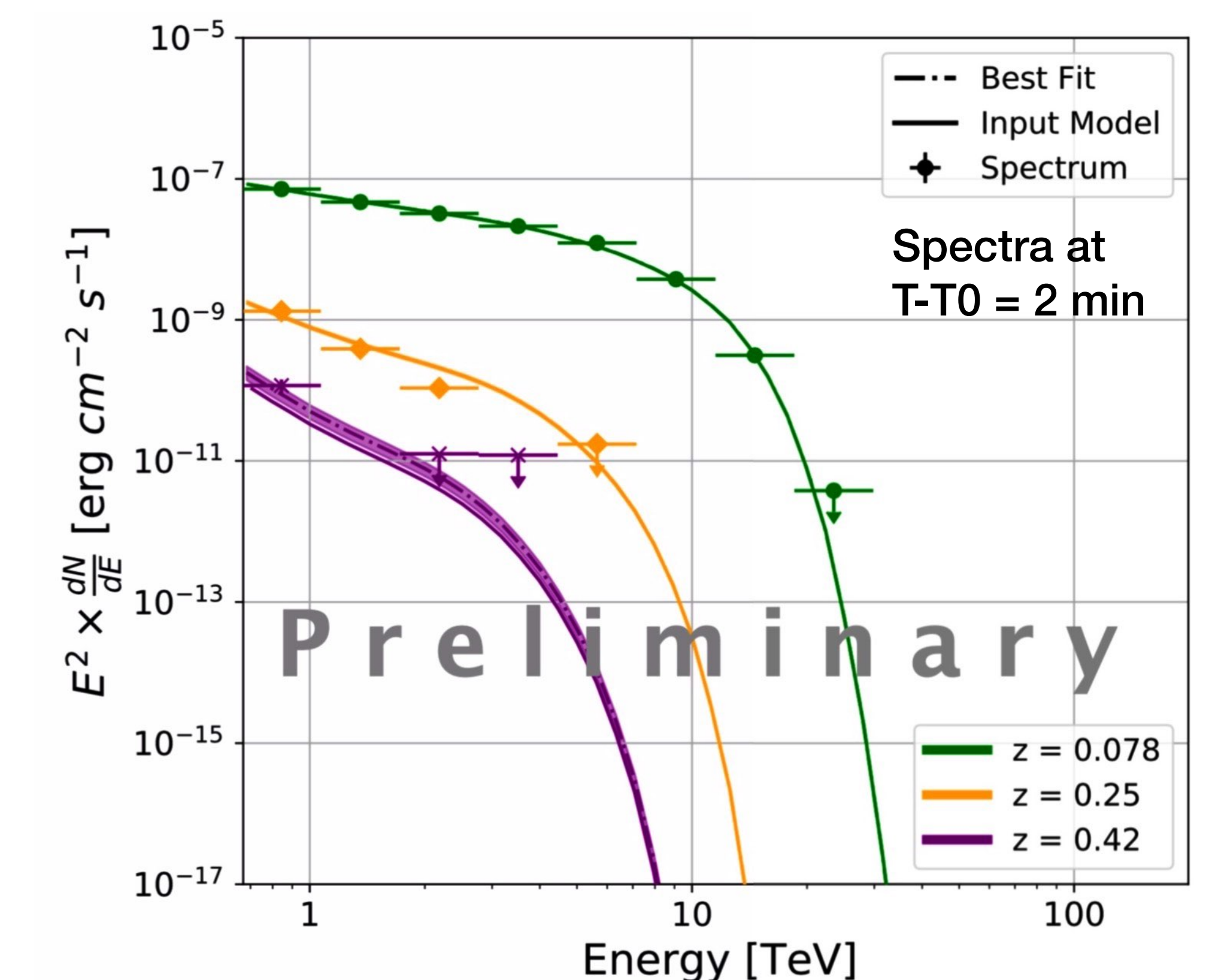
Derived from GRB190114C, rescaling its spectrum and light curve at different redshifts: 0.42, 0.25, 0.078.

GRB 190114C MEASURED SPECTRUM and derived synthetic spectra and light curves



RESULTS:

SIMULATED SPECTRA OF THE SYNTHETIC GRBs
obtained through dedicated Instrument response functions (IRF) [4]



TAKE HOME MESSAGES

- ▶ ASTRI Mini-Array can detect bright and nearby GRB within few minutes from the burst.
- ▶ The spectral cutoff can be measured, intrinsic or originated by the EBL absorption.
- ▶ Optimization of the observing strategy and for the selection of the GRB, GW, neutrino alerts, is being developed.