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Authors	URSI, ALESSANDRO, Romani, M., VERRECCHIA, Francesco, PITTORI, Carlotta, TAVANI, Marco, MARISALDI, MARTINO, Galli, M., LABANTI, CLAUDIO, PARMIGGIANI, Nicolo', BULGARELLI, ANDREA, Addis, A., Baroncelli, L., CARDILLO, MARTINA, CASENTINI, CLAUDIO, Cattaneo, P. W., Chen, A., Di Piano, A., FUSCHINO, FABIO, Longo, F., LUCARELLI, Fabrizio, Morselli, A., PIANO, Giovanni, VERCELLONE, STEFANO
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The Second AGILE MCAL Gamma-Ray Burst Catalog: 13 yr of Observations.

URSI A., ROMANI M., VERRECCHIA F., PITTORI C., TAVANI M., MARISALDI M., GALLI M., LABANTI C., PARMIGGIANI N., BULGARELLI A., ADDIS A., BARONCELLI L., CARDILLO M., CASENTINI C., CATTANEO P.W., CHEN A., DI PIANO A., FUSCHINO F., LONGO F., LUCARELLI F., MORSELLI A., PIANO G. and VERCELLONE S.

Abstract (from CDS):

We present the results of a systematic search and analysis of GRBs detected by the Astrorivelatore Gamma ad Immagini LEggero (AGILE) MiniCALorimeter (MCAL; 0.4-100 MeV) over a time frame of 13 yr, from 2007 to 2020 November. The MCAL GRB sample consists of 503 bursts triggered by MCAL, 394 of which were fully detected onboard with high time resolution. The sample consists of about 44% short GRBs and 56% long GRBs. In addition, 109 bursts triggered partial MCAL onboard data acquisitions, providing further detections that can be used for joint analyses or triangulations. More than 90% of these GRBs were also detected by the AGILE Scientific RateMeters (RMs), providing simultaneous observations between 20 keV and 100 MeV. We performed spectral analysis of these events in the 0.4-50 MeV energy range. We could fit the time-integrated spectrum of 258 GRBs with a single power-law model, resulting in a mean photon index $\langle\beta\rangle$ of -2.3. Among them, 43 bursts could also be fitted with a Band model, with peak energy above 400 keV, resulting in a mean low-energy photon index $\langle\alpha\rangle = -0.6$, a mean high-energy photon index $\langle\beta\rangle = -2.5$, and a mean peak energy $\langle E_p\rangle = 640$ keV. The AGILE MCAL GRB sample mostly consists of hard-spectrum GRBs, with a large fraction of short-duration events. We discuss properties and features of the MCAL bursts, whose detections can be used to perform joint broad-band analysis with other missions, and to provide insights on the high-energy component of the prompt emission in the tens of mega electron volt energy range.

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Journal keyword(s): *Gamma-ray bursts*

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1	GRB 190114C	gB	03 38 01.18	-26 56 47.8		
2	Fermi bn131028076	gB	03 48	+72.2		
3	GRB 191221B	gB	10 19 19.17	-38 09 27.5		
4	SN 2013cq	SN*	11 32 32.84	+27 41 56.2		

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6	Fermi bn130606497	gB	14 34 07.04	-22 06 08.2		
7	GRB 200829A	gB	16 44 49.42	+72 19 45.3		
8	GRB 180728A	gB	16 54 15.64	-54 02 39.5		
9	Fermi bn140508128	gB	17 01 51.95	+46 46 49.5		
10	Fermi bn090522344	gB	18 30.8	+19 36		
11	Fermi bn090618353	gB	19 36 01.80	+78 21 07.1		
12	Fermi bn150403913	gB	20 46 01.17	-62 42 40.1		
13	Fermi bn110721200	gB	22 10	-38.6		

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