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Fermi LAT and GBM collaboration results on GRB 200415A.

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Magnetars are neutron stars with the strongest magnetic fields known in the Universe, with an intensity up to a thousand times higher than typical neutron stars. Rarely, magnetars can produce enormous eruptions, called Magnetar Giant Flares (MGF), consisting of short-duration bursts of hard X-rays and soft gamma rays –a bright and variable initial spike lasting a few tenths of a second and a significantly dimmer pulsating tail lasting a few hundred of seconds that can only be detected from MGFs within our close to our galaxy. On April 15, 2020, a short bright burst of MeV gamma rays triggered the Gamma-Ray Burst Monitor (GBM) aboard the Fermi spacecraft, called GRB 200415A and localized by the InterPlanetary Network (IPN) inside the disk of the nearby Sculptor galaxy. 19 seconds later, and for nearly 300 seconds, the Large Area Telescope (LAT) detected GeV photons in spatial coincidence with the signal at lower energies. In this talk we present the recently published results of the GBM and LAT analysis on GRB 200415A. Our detailed analysis shows that the low-energy emission has very peculiar properties typically observed in flares from nearby magnetars, while the GeV detection is consistent with the IPN localization and spatially associated with the Sculptor galaxy. Hence, we infer that gamma rays likely originated with the MGF in Sculptor, and not from a cosmological gamma-ray burst, and we suggest that the GeV signal is generated by an ultra-relativistic outflow that first radiates the prompt MeV-band photons. This discovery represents the first detection of the high-energy emission from a MGF and proves that extragalactic MGFs may indeed disguise as short GRBs and constitute a small fraction of current short GRB samples.

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