

VERITAS Search for Gamma-ray and Optical Counterparts to Fast Radio Bursts

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Detecting and understanding transients have proven one of the most fruitful areas of study in the field of multi-messenger and gamma-ray astrophysics. Imaging Atmospheric Cherenkov Telescopes explore an interesting parameter space with a high sensitivity to rapid events when compared to other instruments. One of the most rapid transients currently under study is Fast Radio Bursts (FRBs). FRBs are an expanding source class of rapid (\sim ms) bursts of radio emission. Many questions remain about the properties of their potential multi-wavelength counterparts. Dedicated radio instruments have enabled an order of magnitude increase in the number of bursts detected, but simultaneous multi-wavelength observations remain challenging. This is primarily due to the observational difficulties caused by their short-lived and sporadic nature. IACTs can simultaneously probe two interesting wavelength bands, optical and Very High Energy (VHE; $>\sim 100$ GeV) gamma rays, making them an ideal instrument to follow-up known repeating FRBs. Following up FRBs and understanding the challenges relating to these observations is not only important for our understanding of the progenitors of FRBs but also for the future of IACT follow-up of other optical/gamma-ray targets like microquasars, pulsars, and M-dwarfs. In this talk, I will summarize the extensive FRB follow-up program at VERITAS including discussions of the simultaneous rapid optical and VHE observations of three bursts from FRB20180916B in 2021. Ongoing work with the study of 6 other repeaters and the status of the optical program at VERITAS will also be presented.

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