

# Space Science Seminar

## WEDNESDAY, 2020 October 28

### 2:00 p.m.

## NASA/MSFC TEAMS

### The Gamow Explorer

Dr. Nicholas White / George Washington University

Host: Dr. Wayne Baumgartner (Sponsored by ST12)

Gamma Ray Bursts (GRBs) are a unique probe that can be used to address key questions about the Cosmic Dawn: When and how did the intergalactic medium become re-ionized? What processes governed its chemical enrichment? How does massive star formation evolve at high redshift? A Long GRB signals when a massive star collapses to form a black hole. The GRB afterglow is for a few days a bright light that far outshines the brightest supernovae and quasars. It can be used to observe the spectral fingerprints of the host galaxy and intergalactic medium out to the highest redshift ( $z$ ) where star formation is active. Observations of GRB afterglows by large telescopes can directly determine the period of reionization and metal enrichment. GRBs can be used to test models for massive star formation and offer the tantalizing possibility to directly observe the death of the first population III stars. Out of the hundreds of GRBs per year, only a few percent are from high redshift. Speed is of the essence. Gamow Explorer is optimized to identify high- $z$  GRBs to enable rapid follow up by JWST and >8m ground-based telescopes. Its sensitivity to high- $z$  GRBs will be ten times Swift, with a photo- $z$  infrared telescope used to identify the high redshift LGRBs. Gamow Explorer also provides the capability required to enable rapid identification of kilonova associated with the merger of binary neutron stars (BNS). These merger events are associated with gravitational wave events with large celestial location uncertainties. Gamow Explorer will provide < 1000s wide field of view X-ray observations to rapidly locate the short gamma ray burst counterpart. Launched in 2028 into an L2 or high Earth orbit Gamow will provide high value targets that will enhance the science return of JWST during its planned 10yr lifetime and will be timed to coincide with the advanced (A+) capabilities of the LIGO/Virgo gravitational wave detectors.

<https://solarscience.msfc.nasa.gov/colloquia/>

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