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Programming Skills
Low-Level
C/C++
Python
FORTRAN
LaTeX

High-Level
XSPEC
Stan/JAGS
R
IDL

Instrument Teams

Fermi LAT & GBM

J. MichaelBurgess

Astrophysicist

Statement

My work is focused on the analysis of extreme objects including gamma-ray bursts (GRB), supernovae, and X-ray bursts via their temporal and spectral data. The use of advanced Bayesian techniques to model the complex generative processes of astrophysical data is my specialty. Additionally, I use physical, rather than empirical, models when possible to model data processes. My key accomplishments are designing and programming a tool for fitting a physical synchrotron model to Fermi GRB data, designing from scratch a Bayesian fitting engine for spectral analysis of Fermi data, and demonstrating that the external shock model of GRBs is viable by fitting the spectral and temporal multi-wavelength data with an entirely physical model. My publicly available software is available on my GitHub page.

Experience

2017 - Now — Max-Planck-Institut für extraterrestrische Physik, Garching, Germany
I am currently a member of Dr. Jochen Greiner's research group studying GRB emission physics via data from optical to high-energy gamma-ray instruments.

2014 - 2017 **Oskar Klein Fellow** — KTH Royal Institute of Technology, Stockholm, Sweden
As a member of the GRB group at KTH under the direction of Felix Ryde, I investigated several aspects of GRB physics and analysis as well as assisting graduate students in their thesis studies. Developed physical models for GRB spectra and Bayesian software to fit Fermi data to models. Investigated spectral evolution in GRBs and assessed validity of classic spectral correlations related to cosmology and physical model inference. Designed novel scheme to fit Type Ia SNe cosmology data.

2009 - 2013 **Fermi GBM Team** — University of Alabama in Huntsville, USA
Developed the ability to fit physical spectral models to GRB data. Participated in daily satellite operations and data monitoring. Participated in GCN collaboration to quickly distribute information about GRB triggers. Developed many multinational collaborations on various research projects.

Education

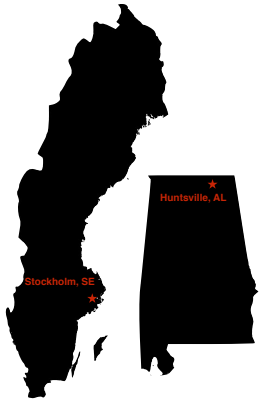
2011 - 2013 **Ph.D. in Physics** — University of Alabama in Huntsville, USA
Dissertation: Discerning the Physical Properties of Gamma-Ray Bursts via Time-Resolved Analysis with Physical Spectral Models
Advisor: Prof. Rob Preece

2008 - 2011 **Master in Physics** — University of Alabama in Huntsville, USA
Main subjects: Astrophysics

2003 - 2008 **Bachelor's of Science in Physics & Mathematics** — University of Alabama in Huntsville, USA

Software Teams

Places Worked



Languages

English ★★★★★

Swedish ★☆☆☆☆

Selected Publications

Total Publications: 38

The Anatomy of a Long Gamma-ray Burst: A Simple Classification Scheme for the Emission Mechanisms(s)
Bégué, D and Burgess, J Michael
ApJ 820.1 (Mar. 2016) p. 68. IOP Publishing, 2016

An External Shock Origin of GRB 141028A
Burgess, J Michael et al.
ApJ 822.2 (2016). 2016

Synchrotron emission in GRBs observed by Fermi: its limitations and the role of the photosphere
Iyyani, S, Ryde, F, Burgess, J Michael, et al.
MNRAS 456.2 (Feb. 2016) pp. 2157–2171. 2016

Are GRB blackbodies an artefact of spectral evolution?
Burgess, J Michael and Ryde, Felix
MNRAS 447.4 (Mar. 2015) pp. 3087–3094. 2015

Taking the band function too far: a tale of two 's
Burgess, J Michael, Ryde, Felix, and Yu, Hoi-Fung
MNRAS 451.2 (Aug. 2015) pp. 1511–1521. 2015

On spectral evolution and temporal binning in gamma-ray bursts
Burgess, J Michael
MNRAS 445.3 (Dec. 2014) pp. 2589–2598. 2014

An Observed Correlation between Thermal and Non-thermal Emission in Gamma-Ray Bursts
Burgess, J Michael et al.
ApJL 784.2 (Apr. 2014) p. L43. 2014

Time-resolved Analysis of Fermi Gamma-Ray Bursts with Fast- and Slow-cooled Synchrotron Photon Models
Burgess, J Michael et al.
ApJ 784.1 (Mar. 2014) p. 17. 2014

The First Pulse of the Extremely Bright GRB 130427A: A Test Lab for Synchrotron Shocks
Preece, R, Burgess, J Michael, et al.
Science 343.6166 (Jan. 2014) pp. 51–54. 2014

GRB110721A: An Extreme Peak Energy and Signatures of the Photosphere
Axelsson, M et al.
ApJL 757.2 (Oct. 2012) p. L31. 2012

The Fermi GBM Gamma-Ray Burst Spectral Catalog: The First Two Years
Goldstein, Adam, Burgess, J Michael, et al.
ApJS 199.1 (Mar. 2012) p. 19. 2012

Constraints on the Synchrotron Shock Model for the Fermi GRB 090820A Observed by Gamma-Ray Burst Monitor
Burgess, J Michael et al.
ApJ 741.1 (Nov. 2011) p. 24. 2011

A full publication list can be found via this link: Full Publication List

Honors & Awards

2014 **Oscar-Klein Postdoctoral Fellowship: Stockholm, Sweden**

2012 **AAS Chamblis Award at Austin, TX meeting**

2010 **Alabama Space Grant Consortium Graduate Fellowship**

2008 **Curry Astrophysics Graduate Fellowship**

2007 **Vanderbilt Prize for Undergraduate Research in Physics and Astronomy**

2007 **Alabama Space Grant Consortium Undergraduate Fellowship**

2006 **NASA Institute of Advanced Concepts Research Fellowship**

2003 **University of Alabama in Huntsville Academic Excellence Scholarship**

Funding

2016 **Astronomy and Space sciences 2016** AST2016-0014
Kungl. Vetenskaps-Akademien

Teaching

2016 **Astroparticle Physics (SH2204)** Assistant Lecturer
KTH Royal Institute of Technology

2015 **Astroparticle Physics (SH2204)** Assistant Lecturer
KTH Royal Institute of Technology

2014 **Astrophysics (SH2402)** Assistant Lecturer
KTH Royal Institute of Technology

2014 **Astroparticle Physics (SH2204)** Assistant Lecturer
KTH Royal Institute of Technology

Advising

2014 **Shabnam Iyyani** Assistant Ph.D. Advisor
KTH Royal Institute of Technology

2014 - Now **Liang Li** Assistant Ph.D. Advisor
KTH Royal Institute of Technology

Conferences/ Presentations

2016	**On the Fermi GBM event 0.4s GW-150914** GRB Symposium 2016	Huntsville, Alabama
2016	**Exploring Gamma-ray Burst via the Bayesian Paradigm (Invited)** Imperial College London Statistics Seminar	London, United Kingdom
2016	**On the Fermi GBM event 0.4s GW-150914 (poster)** INTEGRAL 2016	Amsterdam, Netherlands
2015	**An External Shock Origin of GRB 141028A** TEAXS Symposium	Geneva, Switzerland
2015	**Taking the Band Function Too Far** Fourteenth Marcel Grossmann Meeting	Rome, Italy
2014	**To Synchrotron or not to Synchrotron** 5th Fermi Symposium	Nagoya, Japan
2013	**Relating the Thermal and Non-Thermal Components of Fermi GRBs** GRB 2013 Symposium	Nashville, TN
2012	**Exploring Fermi GRBs via Physical SEDs** GRB 2012	Malaga, Spain
2011	**Constraints on the Synchrotron Shock Model** 3rd Fermi Symposium	Rome, Italy
2010	**Constraints on the Synchrotron Shock Model** GRB 2010	Annapolis, MD

References

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May 23, 2017

J. Michael Burgess