

Current and Pending Support David C. Collins

Current Funding

Project Title: Magnetic Fields in the Formation of Molecular Clouds, Filaments, and Cores

Project PI: D. C. Collins

Program Name and award number: NSF AAG AST-1616026

Period of Performance: 09/01/2016 - 08/31/2019

Amount \$298,492

FTE: 1.0 Month/year

Summary of Work: This project is studying the gravitational collapse of molecular clouds using simulations of magnetohydrodynamical turbulence. There is a synergistic overlap with the proposed work in the shared use of high performance computing software and resources.

Project Title: Modeling CMB polarization foregrounds and their isotropy violation

Project PI: K. Huffenberger

Program Name and award number: NASA ATP NNX17AF87G

Period of Performance: 01/08/2017 - 01/07/2020

Amount \$428,043.00

FTE: 1.0 Months/Year

Summary of Work: In this project, we are modeling the CMB foregrounds using a number of techniques, including an analytic filament model and simulations. The proposed work continues and extends the researching ongoing in this project.

Project Title: Signatures of Type Ia Supernovae Explosions and their Cosmological Implications

Project PI: P. Hoefflich

Program Name and award number: NSF AAG AST-1715133

Period of Performance: 10/01/2017 - 09/31/2020

Amount \$460,498.00

FTE: 0.0 Months/Year

Summary of Work: In this project, we examine the role of magnetic fields in Type Ia supernovae. There is a synergistic overlap with the proposed work in the shared use of high performance computing software and resources.

Pending

Project Title: SNE Ia: Imprints of the Explosion & Progenitor, Model-Independent Relations & Cosmology.

Project PI: P. Hoefflich

Program Name: NSF AAG

Period of Performance: 8/1/2020-7/31/2023

Amount \$498,209

FTE: 0.5 Months/Year

Summary of Work: This proposal will examine a new model for Type Ia Supernovae light curves. In addition we will examine the impact of magnetic fields on Type Ia light curves.

Project Title: CMB Polarization Foreground Effects on B-modes and Lensing

Project PI: K. Huffenberger

Program Name: NSF AAG

Period of Performance: 8/1/2020-7/31/2023

Amount \$533,715

FTE: 1. Months/Year

Summary of Work: This proposal is a general study of foreground effects on CMB-based gravitational lensing products. It proposes to use analytic filament models and MHD simulations, similar to the current proposal. It differs from the current proposal in that there is no postdoc funding to examine delensing and its specific effect on CMB-S4's science goals.

Project Title: Simulations of Galactic Magnetism

Project PI: D. Collins

Program Name: NSF AAG

Period of Performance: 8/1/2020-7/31/2023

Amount \$282,024

FTE: 1. Months/Year

Summary of Work: This proposal will produce simulations of the Galactic magnetic field. These galaxy simulations will offer self-consistent magnetic pictures, while the current proposal will offer high resolution and smaller scale structures.