Hubble Space Telescope

Cycle 16 AR Proposal

Beyond the Textbook: Temporal Systematics of Planetary Nebula Evolution

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Scientific Category: ISM AND CIRCUMSTELLAR MATTER

Scientific Keywords: CENTRAL STARS OF PLANETARY NEBULAE, PLANETARY NEBULAE, PROTO-PLANETARY NEBULAE, WINDS/OUTFLOWS/MASS-LOSS, JETS

Total Budget Amount: $98,000 (Post-doc, travel, summer support)

Theory: Yes

Abstract

The study of PN shapes has been propelled forward by the high angular resolution of HST into a state of flux. Currently the field is undergoing a profound reassessment as mechanisms such as binary companions, accretion disks, MHD outflow launching and jets become central to a fundamental understanding of these objects. Making progress now requires more systematic studies of PN databases (such as HST) which show strong evidence that nebular shapes change dramatically in time. In order to connect PN shapes to evolutionary mechanisms we propose using high resolution Adaptive Mesh Refinement MHD codes, built by the PI, to follow the evolution of three broad classes of models and compare their predictions with the existing data, particularly a new catalogue of HST PN images.

Investigators:

	Investigator	Institution	Country
PI	Dr. Adam Frank	University of Rochester	USA/NY
CoI	Dr. Bruce Balick	University of Washington	USA/WA
CoI	Dr. Orsola De Marco	American Museum of Natural History	USA/NY
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Number of investigators: 4

Dataset Summary:

Instrument	No. of Datasets	Retrieval Method	Retrieval Plan