Hubble Space Telescope

Cycle 16 AR Proposal

Shedding Light on Feedback: The Interaction of YSO Outflows in L1551

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Theory: Yes

Abstract

Energetic outflows are an ubiquitous phenomena associated with young stellar objects and are believed to exert a strong effect on their parent molecular clouds. In most young clusters the density of newly forming stars implies that parsec scale outflows may sweep over a significant fraction of the cluster volume and interact with each other. The nature and dynamics of these interactions in an environmental context has yet to be investigated in detail. Thus the time is ripe to push forward the construction of detailed ecological studies of star formation where the cloud, stars and outflows are seen as a coherent interacting system. Such a perspective is however hampered by the complexity of the problem. Proceeding forward will require isolation of key components of an overarching theory. Finding relatively clean examples of outflow feedback is critical to exploring more general issues star formation ecology. We seek to carry forward a well focused study of outflow feedback in the L1551 region. Using Adaptive Mesh Refinement MHD code we propose a computational study of multiple jets interacting with their environment and their role in altering the properties of their parent cloud. The questions to be addressed are: What is the combined effect of jets oriented at different angles on the overall turbulent motions in the cloud; How effective is the coupling between outflows atndcloud material; How effective are the combined outflows at disrupting and dispersing the cloud material; How effective are the combined outflows at seeding turbulence into the cloud.

Investigators:

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Number of investigators: 4

Dataset Summary:

Instrument	No. of Datasets	Retrieval Method	Retrieval Plan